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REPORT

M. plate
OF THE
JIT GROWERS' ASSOCIATION

OF THE
PROVINCE OF ONTARIO,

FOR THE YEAR

1874.

TO WHICH IS APPENDED, THE

REPORT OF THE ENTOMOLOGICAL SOCIETY

FOR 1874.

Printed by order of the Legislative Assembly.



Toronto:

PRINTED BY HUNTER, ROSE & CO., 86 & 88 KING STREET WEST.
1875.

Montreal Horticultural Society

AND

Fruit Growers Association of the Province of Quebec.


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Presented by W. W. D. Beadle

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FLEMISH BEAUTY.

DRAWN FROM NATURE & COLORED BY W. H. PRESTEL. BLOOMINGTON, ILLS.

OF THE

FRUIT GROWERS' ASSOCIATION

OF THE

PROVINCE OF ONTARIO,

FOR THE YEAR

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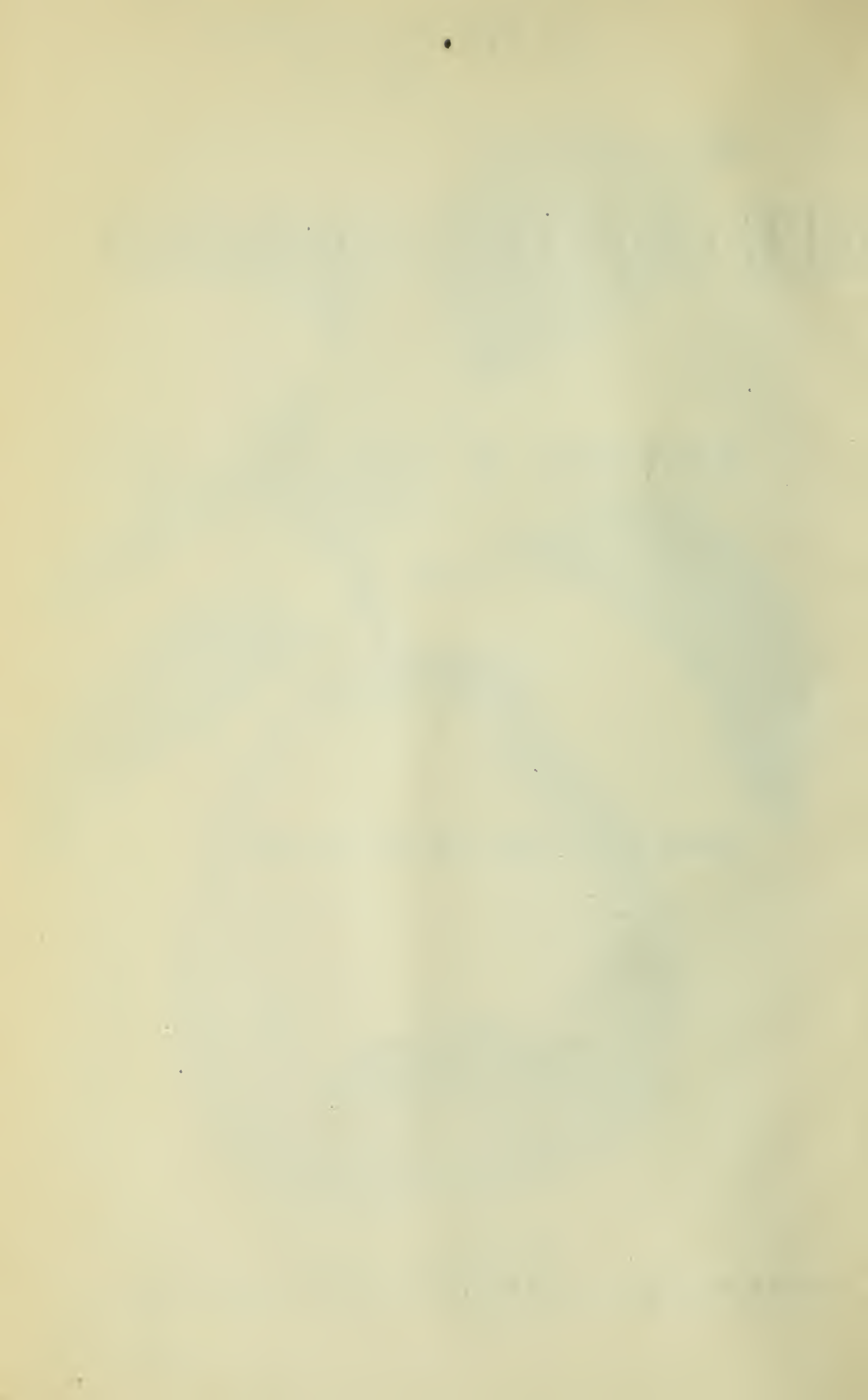
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ANNUAL REPORT
OF THE
FRUIT GROWERS' ASSOCIATION
OF ONTARIO,
FOR 1874.

To the Honourable the Commissioner of Agriculture :

SIR—It is again my agreeable duty to submit the Report of the transactions of the Fruit-Growers' Association of Ontario. You will find, by examining the discussions of our three stated meetings, much valuable information on Fruit-Growing. The winter meeting held in Hamilton was very largely attended. The interest of the meeting was greatly enhanced by the presence of a delegate from the Horticultural Society of western New York. At Owen Sound and Ottawa, the attendance was increasingly large, and much valuable information on Fruits and Fruit-Growing was elicited, specially adapted to those particular localities. The good influence attending those meetings has been fairly established by the steady interest that has been felt and expressed by individuals in these neighbourhoods, and in no way so much as by the numbers that have attended our meetings, eager for information on Fruit-Growing. So much has this been the case, that I have every reason to congratulate you on the good that has arisen from the action that has been taken in choosing different localities as the field of our labours.

A felt want has arisen from the important labours of our hybridists, who are every year adding to our stock of new fruits—that want being a piece of land adapted to the testing of these new fruits. If a piece of ground could be got in a district of the Province favourable to Fruit-Growing, and these fruits there fairly tested, your directors would then have a warrant for their general dissemination over our western Province. I beg leave most respectfully to suggest to you, that if Government would purchase a few acres for this laudable object, the Association would have the means out of their own proper funds to care for the plants, and to keep the grounds in order.

I further suggest that the Government might subsidise our efforts to appear at Chicago in 1875 with our Canadian fruits, as the Government did when the Association went to Boston a year ago ; for I am fully persuaded that immigration and the best interests of the country are greatly aided by these exhibitions of our own fruits abroad. Our success at Boston shows conclusively that our Canadian fruits can compare favourably with those of any part of the continent, and reveals the fact that our climate for fruit-growing, and consequently for the production of all the comforts and luxuries of life, is second to none. As in former years, we have continued the distribution of trees and plants with marked success : this distribution is not only beneficial to our members, in encouraging them in fruit culture, but eminently encouraging to our hybridists, whose fruits are being largely circulated by your association.

I have submitted the proposed amendments to the Agricultural Act, which relate to our Association, to the Directors, and they approve of them all.

The Society continues its prosperous career. It is gradually embracing every district of the Province, and awakening a hitherto unfelt interest, and desire for information wherever its operations have become known.

I have the honour to be

Your obedient servant,

D. W. BEADLE,

Secretary of the Fruit-Growers' Association of Ontario.

PROCEEDINGS AT THE ANNUAL MEETING.

The Annual Meeting was held in the Agricultural Hall, in the City of Toronto, on Tuesday Evening, the 22nd September, 1874.—The President in the Chair.

Secretary Beadle read the minutes of the last Annual Meeting.

The Directors' Report was received and adopted.

The Treasurer submitted his Report, which was received, and referred to the Board of Directors.

The President read his Annual Address.

John Forsyth moved, seconded by Philip Armstrong, that the thanks of the meeting be given to the President for his able and interesting address; and requested that it be handed to the Publication Committee for insertion in the Report.

It was moved by L. S. Lundy, and seconded by Mr. Parker of Woodstock, that a Committee of eleven be appointed to nominate officers for the ensuing year, which, after discussion, was carried, and the following persons appointed such Committee.

The President and Secretary, and Messrs. John Forsyth, Geo. Leslie, Jun., A. W. Smith, T. A. Parker and — Paulding.

The Committee made their Report, and the Association proceeded to vote on the names proposed, with the following result.

President.—Rev. Robert Burnet, Hamilton.

Vice-President.—Geo. Leslie, Jun., Leslie P. O.

Secretary-Treasurer.—D. W. Beadle, St. Catharines.

Directors.—P. C. Dempsey, Albany; Peter Murray, Hamilton; Charles Arnold, Paris; William Saunders, London; John Gray, Toronto; Jas. Skead, Ottawa; Jas. Dougall, Windsor; Henry Macpherson, Owen Sound; Geo. Elliott, Guelph.

Auditors.—W. J. McCalla, Jas. Taylor, both of St. Catharines.

Several seedling fruits were exhibited at the meeting, and at the fair ground

Geo. Peacock, of Mount Salem, exhibited a noteworthy seedling peach, large, handsome and of first quality.

Mr. Cannon of Owen Sound, showed two seedling apples, the Rhymer, and Coe's golden drop.

Haskin's seedling grape, a hybrid between the black Hamburg, and Hartford prolific.

Another seedling from the same parentage was exhibited by P. C. Dempsey, named the Burnet. Both grapes of great promise.

The meeting then adjourned.

DIRECTORS' REPORT.

At the close of another year your officers have the satisfaction of being able to congratulate the members upon the continued prosperity of the Association. We have held three very successful meetings during the year—at Hamilton in February, at Owen Sound in July, and at Ottawa in September, and at each of these meetings very much valuable information was elicited, which will be fully spread before you in the Annual Report. We feel more

than ever convinced of the usefulness of these meetings in awakening and deepening an interest in fruit-growing, and of the wisdom of holding them in different sections of the Province as opportunity may offer.

The attention of your Board has been most earnestly occupied in the endeavour to diminish the cost of distributing the trees or plants sent to the members. Owing to the fact that the gooseberry and grape vine sent out the past year were of so much smaller size than an apple or pear tree, that they could be transmitted by mail, we have been able this year to effect a very considerable reduction in the cost of the distribution. We are so well pleased with this mode that we advise, that after the distribution of next spring, that only trees and plants of such size as can be transmitted by mail be distributed to members. Only those who have had some experience in the distribution of trees of the ordinary size can realize the vast amount of labour and expense that must be incurred in packing in suitable boxes, and forwarding to their destination such bulky articles. And beside the expense, great dissatisfaction has arisen in quite a number of instances, from the neglect of the person to whom the parcels are consigned in attending to the proper delivery of the trees to the several members by whom they should be received. We are now satisfied that if the several parcels are sent directly to each member by mail, much saving would be effected to the Society in the cost of packing and forwarding, and members will receive their trees more surely, more promptly, and in better order.

In order, also, to avail ourselves of every possible means whereby we may secure the lowest prices for all labor performed for the Association, we have pursued the plan of asking for tenders and awarding the work to the lowest bidder.

The experience of several years has shown that it is necessary there should be in every locality, some person to remind old members of the necessity of paying their annual fee in order to retain their privileges of membership; as well as to obtain new members, by calling the attention of their friends to the advantages to be derived from becoming members. We therefore suggest to this meeting the propriety of passing a By-Law to the effect that any person remitting to the Secretary the fees and names of old or new members, with their Post Office address, may retain ten per cent. for his trouble.

Remembering the great success of our displays of fruit at Boston last year, when we won so many medals, we should fail in our duty did we not state to you that the American Pomological Society will hold another Exhibition, in Chicago, before the next annual meeting of this Association, and that possibly you might desire to place on record your wishes in regard to the question, whether we shall again make a display of the fruits of Ontario, so that the in-coming Board may take such steps as may be requisite to carry them out.

The report was carried.

ROBERT BURNET,
President.

TREASURER'S REPORT,

Abstract of Treasurer's account of Receipts and Disbursements of Fruit Growers' Association for year 1873-74.

DR.		CR.	
1873-74.			
To Members' fees	\$2,259 00	By balance at last audit	\$561 03
" Government grant	1,500 00	" Printing and advertising as per vouchers	237 19
" Error in Beadle & Buchanan's		" Lithographic plates	541 13
account.....	148 95	" Express charges	41 37
" Error in Sanderson's account ...	2 00	" Directors & Boston Exhibition expenses	624 41
" Balance	89 34	" Trees and plants distributed	1322 99
		" Clerk's wages	105 00
		" Postages	177 55
		" Stationary	23 27
		" Prizes	86 00
		" Secretary-Treasurers salary	200 00
		" Sundries	69 35
			\$3,989 29
	\$3,989 29	1874.	
		October—By balance due Treasurer ...	\$89

We certify that we have examined the accounts, of the Treasurer of the Fruit Growers' Association, that the above is a correct abstract of receipts and disbursements

St. Catharines,
November 18th, 1874.

W. J. McCALLA, {
W. L. COELAND, { *Auditors.*

 PRESIDENT'S ADDRESS, 1874.

The revolving year brings us again in Annual Convocation. Like the members of a large and attached, though scattered family, we rejoice when the opportunity is given us, on the occasion of our reunion, to enter into friendly discussion with each other in regard to those matters that closely refer to our chosen culture. We rejoice that such discussions have always been carried on with the utmost good feeling. The members of our fraternity, while tenaciously holding their own opinions, have ever been ready, indeed, in some instances, with great patience, to listen to the views advanced by others. This is as it should be. We may learn some useful hint from even the veriest tyro in horticulture, and crude views have often been modelled into useful shape by the skilled hand of some one better informed. We trust that this mode of conducting our business meetings may long characterize our gatherings, and that the well-informed and the sagacious may bear with the immature and often erroneous views of the younger members.

Gentlemen of the Fruit Growers' Association of Ontario, I trust that you will bear with me, while I again strive to discharge, to the best of my ability, the onerous duty of again presenting to you some views on the common objects bearing on the well-being of our Association. And should the picture not be so well painted, and the subjects of the picture not so well grouped as you could wish, attribute it, not to any want of desire on my part, to gratify you, but simply from my inability to do justice to my theme.

The past season has not been a very advantageous one for the interests of the fruit-grower. Most of the products of the garden have been a short crop. This has arisen from various causes. In early spring, the nights continued, long into the season, very cold and bleak; and the days even were little suitable for the setting of the fruit. In consequence, the setting was accompanied with difficulties, and in a large proportion of cases, proved an almost total failure. The greatest promise of fruit was apparent, the previous fall having been everything that could be desired to mature and prepare the fruit buds. In the vernal of horticulturists, the young fruit blossoms damped off, and left but a diminished crop for the cultivator. This has been especially the case with the staple fruit product of our country—the apple. Few people ever saw a greater show in blossoms, and at one period there was a general expectation of an abundant crop. The result is a full corroboration of the adage, "There's many a slip between the cup and the lip." In favoured spots, it is true, there is a fair average crop, but this is not general. The Niagara District, as usual, comes out at the wide end of the horn. Here and there in sheltered spots, under favourable circumstances, in many portions of the country, I have found orchards bearing abundantly.

We conclude, on the whole, that the apple harvest will prove a light one.

What is true of the apple, is equally true of the pear; more true unfortunately. Pear trees in spring gave the utmost promise of an abundant crop, but the result is altogether disproportionate to the promise. I have only about half the number of varieties fruiting this year which I had last year, and not a tithe of the quantity. It was well for us, and for our reputation as fruit-growers, that the crop of fruit a year ago was so good and plentiful, as had the Boston Centennial been in 1874, we should have made but a sorry appearance. We may congratulate ourselves, therefore, in the law of compensation; we have less at stake this year than we had last, and may with the greater equanimity bear a lessened crop. Pears, almost all over the country, are poor. Indeed, our faith and likings have received some rude shocks during the summer, inasmuch as one friend after another has assured us of their determination to substitute vines for pears. We have frequently been so pushed with these desponding utterances, that we have only been able to make a poor defence. The outlook is against us. We have had more blight this season than during all the years in which we have cultivated pears. Blight—terrible blight—curculio—trees failing—leaves failing—fruit failing—hope failing—hope, which comes to all, almost failing—leave scarce a wreck behind.

Replant must be our motto. Encouragement must be derived from the fact that young trees give the best fruit. Replant, I say, on the principle of a friend of mine, who, in his domestic economy every year preserves his young poulets for laying purposes, as he affirms that their eggs are sweeter and more delicate than those of the old hens. We ought to replant too, I think, to pursue an improved plan of cultivation. I am persuaded from what I see in my own culture, and in that of many of my neighbours, that we all over-crop. Let us plant young trees and prevent, by thinning, their over-production, and depend upon it our trees will

be longer lived, our fruit more satisfactory, and the blight kept within narrower bounds. I am persuaded that the over-productive force of our fruit trees requires to be artificially restrained. We are only entering on the full realization of this necessity. Plum trees soon fail for no other reason than that they over-crop themselves. At Owen Sound we learned that in many cases plum trees were short-lived. The age of a tree would be lengthened, and its season of fruitfulness increased by judicious thinning. What is true of most trees in this respect is especially true of the plum, as the exhaustion of its resources is from the attempt to mature the shell which encloses the kernel, and not from the production of the pulp. The plum crop has suffered severely of late years as usual from the prevalence and ravages of the curculio. It was refreshing for me to hear during a recent visit of an esteemed friend, Mr. Dewey, of Hartford, Connecticut, that the curculio is disappearing from that section of the United States. Should this prove so it will be another testimony to the fact which many believe in, that these pests are like epidemics, appear as a scourge for a while, and then unaccountably disappear. Our learned entomologist, Mr. Saunders, was telling me lately of an inroad, or invasion of a particular kind of butterfly into the Province from opposite directions, up towards Ontario, on the left bank of the St. Lawrence, and across by the Suspension Bridge, at Clifton. The two streams will meet, or have met, and, co-mingling, they may introduce a destructive, or it may be, a beneficial flood of insects.

There is an eldorado in our land, however, for plum growing, and that is in the region along the southern shores of the Georgian Bay, north of us. It would delight the heart of my co-labourer, Mr. W. H. Mills, of Hamilton, and all other plum growers, to witness the growth of plums of every variety in those regions. No curculio, no borer, no leaf-roller, no blight, no gumming, or, as an Hibernian would say, no nothing at all. Here is a clear case for Rep by Pop, or perhaps of reciprocity, in which we here might leave our plums to the "little Turk," and exchange our apples and pears with the Roys, Millers, Christies, McLeans, and Clarkes, who cultivate plums along the shore from Owen Sound to Collingwood. On the whole the plum crop has been a fair one this season—where jarring has been practised, and faithfully carried out, a good harvest has been the result. In Hamilton, Mr. W. H. Mills has succeeded in securing a good crop, and I am persuaded any one may reap a plentiful harvest by persistent jarring. It requires work, and patience, and perseverance.

Peaches are an abundant crop. Every garden, where any trees remain, has yielded its quota this year. Everywhere we hear of peaches. Our markets are well supplied with this fruit, at first from Illinois and Ohio, and latterly from our own orchards. It must be admitted that, owing to the dry weather, this fruit is small, but, as a set off, they are highly flavoured. A question might be put by some thinking member of the Association, How is it that there is a good crop of peaches and only a medium, or under medium, crop of apples and pears? First, the peach ripened its wood well in the fall of 1873—the buds were mature and full—the winter of '73-'74 was comparatively mild, the thermometer almost never in the more southerly localities falling below 10 degrees or 12 degrees Fah. These facts tend to account for a good peach year.

The grape harvest will prove the best which we have had for many seasons. Wine makers will mark their casks with a white mark, in testimony of the excellence of the vintage. The dry weather has told upon the vines, it is true, but nothing like so much as on other fruit trees. Indeed the vine rejoices in the drought. The ripening has been all that could be desired, and the sample fair and the crop prolific. Here and there a pest that attacks the seed has made its ravages, which are seen in the dried and shrivelled nature of the berry. In our experience the Delaware has suffered as much, if not more, than other varieties. What is called "shanking" too, has diminished the crop. This evil has been much felt in some parts of the Province. The neighbourhood of Hamilton has not escaped, and in some vineyards the loss by this evil has been quite considerable. Adriondac, Creveling, and Concord have also suffered along with other varieties. Over a wide area the grape crop is far above our average, and will amply repay the toil and care of the husbandman.

The smaller fruits have greatly suffered from the dry weather. Raspberries especially dwindled down to small dimensions, and though the strawberry crop was on the whole good, yet it felt the malign influence of Sol's metallic rays. Cranberries, recently become an important and profitable culture, are a light crop from the same cause. The summer of 1874 will be long remembered, like the summer of 1826, as an exceptional year for drought. We strongly hold the opinion that we are doing too little as an Association for the cultivation of

the cranberry. Let us have an Essay for the best mode of cultivating the fruit, another on the best soil for its culture, and a third on the best market. There are several extensive tracts in Western Canada, and especially up the Ottawa Valley, where this culture would amply repay the outlay necessary for its successful cultivation. I wish we had some one among us to act as a poker to give an impetus to the growth of the cranberry. It is a delicious fruit, and is fast rising in importance in its economic uses. Within my remembrance the home market in Britain used to be largely supplied with the fruit from Hudson's Bay and from Russia. There is no reason why this fruit ought not to form a staple from our own sandy bogs and extensive light-soiled, mucky swamps. Many farmers throughout the country might not only add materially to their health by the cultivation of the cranberry, but also augment their income largely by some small attention bestowed upon this fruit.

Such is a brief summary of the year's productiveness as far as we have from observation been able to gather. You might perhaps wish me to stop here, but something more seems absolutely necessary in the President's Annual Address. After rummaging about in many directions, and bothering friends for some text, or subject matter of address, to be at one and the same time both interesting and useful, I am about to draw a few useful lessons or hints from the perambulatory habits of the Association itself.

For some few years past we have tried to make our Association useful in stirring up fruit growers to greater efforts, by appearing at our summer and autumn meetings in some locality noted either for its advancement or for its backwardness in fruit-growing. Of the former class we might truthfully instance Goderich and Guelph. It was like carrying coals to Newcastle, for our members to take fruit on exhibition to Goderich. The plums, apples, and grapes of that locality will stand in fair comparison with the fruit of any other locality in our Province. A slight inspection sufficed the thinking ones of our Fruit Growers' Association to conclude that apples, pears, peaches, grapes, and apricots could be successfully cultivated along the north-eastern shore of Lake Huron. The ameliorating influence of the waters of the Lake has a wonderful effect in securing good crops. Apricots are grown as standards without the common shelter of wall or break. Plums there become a profitable crop. It is not unlikely that the stratum too, near Bayfield, Kincardine, and Goderich has much to do with the good crops. By reference to a geological map you will discover some curious out-cropping strata, which are invariably good for fruit growing. Much, too, is to be said for the persevering, industrious, plodding fruit culturists. They are hard to be beat. One has a furor for grapes, another for apples, and a third for gooseberries. On the whole, we can fairly and conscientiously declare that the Goderich district is fast rising in importance for fruit crops, and that any one desirous of settling in a fruitful district could scarcely do better than make selection of a locality on the shores of Lake Huron.

In some respects Guelph is inferior to Goderich as a fruit growing district; it is, for example, far removed from the influence of a large body of water—it stands high—the winter winds are severe—and frosts are both early and late. With these drawbacks, however, Guelph is a choice spot for the cultivation of some kinds of fruits. Apples and plums are almost always a sure crop. We question if plums could be shown from any district superior to those that were shown at Boston last fall, from the grounds of Mr. George Elliot. They were the admiration of all admirers. Whether we regard the climate, or the soil, Guelph is singularly well adapted for plums. It might, with propriety, be said to be the place of places for plum culture—only having one rival, and that Owen Sound.

The sample of plums shown when the Association visited Guelph, was most praiseworthy. Almost every variety was cultivated, and each sort had its admirers. Townspeople and country folk alike entered into the cultivation, and what is rather uncommon, the farmers from the neighbourhood were little short, if anything, from producing as excellent fruit as that exhibited by what is generally considered the most prosperous townsmen. Intelligent discussion was the order of the day at Guelph, and much was elicited to prove of permanent advantage to the members of our Association. Nothing could exceed the candour and outspokenness of the various speakers; every one was ready to render his quota of information to the general good. A perusal of the Report submitted to Government will amply repay the time and attention bestowed upon it.

A year ago we held our autumnal meeting at Kingston, when several important facts were elicited of general importance to our fruit growing community. Owing to the influence of the Lake, and lake-like expansion of the River, grapes can be successfully cultivated even

in a locality so far to the east and north of Ontario. There are so many modifying influences from currents of air, the warmth caused by the water, soil, shelter, that wonders can be accomplished in fruit growing under these favourable circumstances. To a mere onlooker, Kingston would be pronounced most unfavourable for the finer and more delicate variety of fruits, yet grape vines, pears, and apples flourish well, and yield abundant and remunerative crops. This, however, is within the City limits, and the immediate neighbourhood of the City. At Heathfield, pears which have withstood the climate for many years, are to be found. The effects of the severity of the cold winds in winter are to be seen, but shelter, kind treatment, and perseverance have done wonders. Much is yet to be accomplished in this locality for fruit growing—a few energetic and willing workers are greatly needed—great things have indeed been done, but much yet remains to be done. From all we could see and learn, the apple crop is the mainstay of the district. In some sheltered orchards, apple trees of what are considered tender varieties further west, flourish well and give excellent crops. From one of the Kingston *savans* in fruit culture, we learned an important truth, to which it is the duty and pleasure of your president to give as wide a circulation as possible, in reference to jarring plum trees for the curculio, viz. : that the jarring should commence much earlier than is thought needful—even before the formation of the young fruit. Indeed, that a few curculio caught before copulation, nips the evil in the bud. Jarring should commence from the time the buds begin to open. We learned also from our visit to Kingston, that our meetings should not in any measure run counter to, or even alongside of any other agricultural or horticultural exhibition. When public attention is distracted by two or three important matters, some one or the other of the interests represented must go to the wall. Our gatherings should invariably either precede, or succeed County, Township, or other municipal shows, and should in no case be held on the same day.

Chatham is another of the places in which the Association has met for the furtherance of our fruit interests. In most places we have had to note some drawback to perfect success in fruit culture. At one place the soil was damp, or the rock too near the surface—at another, the elevation above the sea level was too great for successful fruit operations—at a third, some few of the harder varieties of fruits could be cultivated, and some not, owing to early and late frosts; but, at Chatham, there was no drawback of any of these kinds. The soil was found to be all that could be desired, almost inexhaustible in its fertilizing properties, and of almost incalculable depth—favourable season—favourable elevation—and occupying one of the most southern localities in our Western Province. There has been no place which the Association has visited, that can be compared to this, in point of eligibility, for fruit culture. Fruit culture, however, is in a backward state at Chatham. There was promise of magnificent grapes, and here and there large areas had been planted with this profitable fruit, still there was something wanting—that something we felt to be the enthusiastic pursuit of fruit growing for its own sake. Every variety of fruit would yield abundant return here with only partial care and attention. We are persuaded that the apple will soon become a staple of export from Chatham and neighbourhood—with drainage, I see no limit to apple production. In the orchard of one of our prominent members, we saw fine specimens both of trees and fruits, and especially of apples. Pear culture can scarcely be said to have assumed its proper place. Down the river a little distance there are some splendid samples of old seedling pear trees, which induced the thought that with proper cultivation, this is indeed a highly favoured district for pear culture. We may depend upon it, wherever the trees seem to grow as if they were indigenous to the soil, the cultivated varieties would do well. We have already mentioned the excellence of the soil at Chatham. It is something wonderful—enough to make one long for twenty or thirty acres in which they could luxuriate in a pear orchard. It is, too, the country of the peach and vine. It is indeed a land that might be made to flow with fruit and honey. Perhaps there is no locality that is more susceptible of fruit growing than the Chatham district. Kent and Essex have long been famous for their fruits, and the past cultivation has clearly shown what these counties could accomplish in fruit raising. A strong pull, a long pull, and a pull altogether, and great things are in store for this locality. The Corypheus of our Association of fruit growers in the West is undoubtedly the worthy ex-member of our Board, Mr. Dougall of Windsor. No one in the West has gone to greater expense, been more indefatigable in pushing fruit interests than Mr Dougall. His fame as an importer is well known, and those of us who know his taste in pears, esteem him greater than a prince, and admire him as a man and friend. We want more like him in

taste and good fellowship, and trust that he may be long spared to adorn our society, and prove a blessing to his neighbourhood. His seedling grapes, gooseberries, peaches, apples, and pears, rank high on the other side, and as long as we can point to the "Rosebank" peach, the Goyeau apple, the "Elliot's Early" pear, the Windsor seedling grape, and others equally good, we may be proud of having him enrolled in our ranks.

The visit of the Association to Chatham impressed every member present with the fact that fruit growing of every kind could be profitably prosecuted here. As in other districts we could name much that requires to be done. If the Association had means to afford to try the experiment, and the proper agent could be got, a mighty impetus could be given to fruit growing, by holding meetings for discussing and exhibiting plates of the best varieties of fruits, the best markets, the best modes of cultivation, and generally to foster fruit interests throughout the Province. A diffusion of the knowledge of the best fruits would go far to make our Province the Garden of the West. Chatham would hold no second place in this Paradise, and we believe that the valley of the Thames is yet destined to take a foremost place among our prominent fruit districts. Here, as elsewhere, much has yet to be done—patriotic efforts must be made, individuals must step forward, and while pushing their own interests, must also do something for the general good. A profitable speculation might be made here in planting walnut and butternut trees. The cultivation of the walnut amounts almost to nothing. We know of no place where it might be more successfully prosecuted, green walnuts and butternuts pickled would bring in a large revenue to the man who had the courage to enter into the speculation. I heard lately that one individual near Kingsville paid the rent of quite a number of acres by the chesnuts from a few trees, finding a ready sale for them in Detroit and Windsor. What one does many may do. The cultivation of nuts is an important branch of fruit culture, which by us has been greatly neglected. Our Fruit Growers' Association has much to do yet in spreading information on this and other kindred subjects. Chatham we again affirm is a suitable field for the cultivation of every kind of fruit grown in this wide and fertile Province.

Some surprise was expressed in certain quarters, when it was known that the Directors of the Association had determined to visit Owen Sound. One man said, "Why you might as well visit the North Pole." And yet we are persuaded that no visit that our Association has paid has been more productive of good than our Northwestern meeting. The members of the Association were unprepared for what greeted them on reaching Owen Sound, proving beyond controversy that here and there much is being done in fruit growing of which the general public know nothing. Efforts which are all the better of being published, which benefit alike those engaged in them, and the observer. Our Summer meeting of this year was a grand success. It has brought within our ken one of the best fruit-growing districts of our country,—has presented us a portion of territory, which may be said to be a specialty in plum growing, and which contains fruit growers second to none in skill, perseverance and enthusiasm. Our Owen Sound visit was a new experience—we went thinking we were well able to instruct, and bestow a wrinkle in fruit-growing. We were met with growers fully up to the mark in all essentials, and with men who were generous enough to tell us frankly all they knew for the public benefit. We met generosity in every way. There seems to me to be a kind of mutual freemasonry, or brotherhood among fruit-growers that greatly characterizes them in their intercourse with each other. Some of the members of our Association there we have known personally for years, but others of them whom we knew not were only to be seen, and met with, to be known and friendly at once. A generous rivalry existed among them, who was to do us the greatest kindness. The urbanity and courtesy of Mr. William Roy will never be forgotten, who in royal style feted the Association, and the numerous company of fruit-growers gathered at Owen Sound on the occasion. Were it allowable to speak of the other head of Mr. Roy's household, and we cannot understand why we should not, just as we have often thought that a mixture of the other sex in our meetings might be a strengthening of our hands in fruit growing, we would say as we are bound to say, that worth, learning, genius, and science often peer out in the most unlikely places. In Mrs. Roy, we have without one particle of affectation, a correspondent with the learned and scientific in foreign lands,—one generally up in physics and especially skilled in botany and fruits—one whose knowledge in art is only equalled by her modest and womanly character. Everyone with whom we came in contact were whole-souled in our cultivation—from the Judge, and member of Parliament, to the least cultivator and experimenter in a garden. Everyone was

hand in hand with us in our efforts, not without the benefit of clergy in the whole land.

Owen Sound owes much of its excellence in fruit-growing to several causes. First, its situation on the Georgian Bay, whose vast expanse moderates the cutting northern blast, and thus saves the trees from the dry, withering, wintry winds. To our astonishment we found that fruit-trees, nay, that peaches did well on elevated knolls, while they were often failures in low, mucky, rich bottoms. There is only one way in accounting for this, viz., that the equinoctial rains rush up the young summer shoots into a fresh or recent growth, and then when winter comes with its biting rigours, the immature buds yield to its killing influence. Trees on eminences, on the contrary, have matured their wood and fruit-buds, growth in autumn is poor and partial, the warm currents of air freely circulate around them, the very situations prevents masses of dull, heavy, wet, cold fogs from hovering over them, and hence their immunity.

Not only, however, is the Bay a fortune to the inhabitants, but the soil, too, is altogether in their favour. It is fully impregnated with limestone, and is of itself of a sharp, gravelly nature, which is admirably adapted for fruit-growing. Owen Sound itself is singularly well sheltered, as well as romantically situated. Its bold over-hanging precipices, and enclosing ranges, make it a choice fruit place. The town owes much of its fertility to its location, and much, as we have already hinted, to its indefatigable fruit cultivators.

Its specialty is plums, and we might, also, truthfully add, apples. The plum thrives here surprisingly; no curculio to rob the cultivator of his labour; no rot in another form to do the same work; no leaf-roller; no borer, for exemption from which, I fear, the Owen Sounders are not sufficiently thankful, as such pests are generally present everywhere, and not exceptional, I fear some of you may think, from the chief seat in your Annual Associational gathering. Every variety of plum is cultivated, and cultivated successfully, at Owen Sound; some almost unknown to me even by name. The luxuriance of the trees and foliage afforded us the utmost delight. "It never rains but it pours," is a common saying, which is fully verified in the abundant plum crop in this neighbourhood; the abundance is something wonderful; and this not in one variety, but in all. To the question, "Which kinds do best?" the answer was, "They all do well." So greatly was our worthy and esteemed Vice-President captivated with the fruit-growing on the shore of the Georgian Bay, that he, then and there, declared his half-formed intention of pulling up stakes at Paris, and levanting to Owen Sound. It seems that it is dangerous to take stayed heads to this fruit Eldorado; what, however, would be our loss if such a project were carried out, would be their gain.

Nor is speculation of a scientific cast awanting on the banks of the Sydenham. To the utter confusion of such thinkers, and talkers, and philosophers as Saunders and Arnold, some of our friends there maintained what was a paradox to us, that all the stones of a certain kind of plum produced similar trees, and similar fruit to that of the parent tree. Theory without generalization is worthless, and we therefore suggested that means be taken to verify or explode the theory. We have no doubt that our friend, Mr. McLean, will lend attention and care to elucidate this disputed and radical point. It only requires to be added to fully demonstrate the fruit-bearing capabilities of this district in plum-growing, that one firm alone in Owen Sound, during last season, shipped 4000 bushels to New York market. We like to mention the pecuniary feature of this plum-culture, for, after all, it's the cash that makes the mare to go.

We found apples, pears, grapes all cultivated in this quarter. The list of the variety of apples, to us told its own tale of deep interest. Apple trees are not infested with blight in this district, a fact which, were I not so nearly within hearing of our learned Beadles, and Grays, our Leslie and Saunders, our Arnolds and Dempseys, I would whisper indicated an atmospheric origin. This subject of blight, if it does not speedily obtain some elucidation and some remedy, will blight our best and most valuable cultivation, that of the apple and pear.

Arboriculture is not neglected at Owen Sound. Royston Park, the seat of Mr. Roy is an oasis amid the surrounding waste—here are many varieties of flowering shrubs and rare plants, flourishing luxuriantly; affording by their multifiform beauty in leaf, and flower, and form, delight to the mind and elevation to the character.

Ottawa was the scene of our autumnal visit. Here is indeed a large field for our cultur-

ing care. It would be wrong to say that Ottawa was so far out of the way as Owen Sound—wrong, because, after all it is the metropolis and centre. Yet in a fruit-growing sense it is on the outskirts of our Province. On the principle, however, that the whole Province is our field of labour, our endeavour shall be to forward alike every fruit-growing interest everywhere, and hence our presence at the beginning of the month at Ottawa. We had here the rare privilege of the patronage and kindness of an old member of our Association and a keen cultivator, the Hon. W. R. Scott. He is one of those who sets the example to fruit-growers and then says, "Come and do as I do." Fruit-growing in the Ottawa Valley is yet in its infancy. Still, from what has been essayed, we may learn what may yet be done. The Flemish Beauty pear does well opposite the city on the Hull side of the river, and here again on what may be called the upland. Perhaps we have been too careful in always planting in bottoms and sheltered nooks. A dry hill-side is not the worst locality for fruit trees. Both at Owen Sound and at Ottawa we meet with staggering facts, which somehow or other give a rude shake to our preconceived theories. Important discussions were held on the proper means of forwarding fruit interests in the Ottawa Valley. A fundamental means of advancing these interests, as was most befitting, was temperately yet keenly debated—that was, the benefits and importance of draining. Draining, of course, cannot be over-estimated in its influence on fruit trees, but it seemed to us at a distance, as if the discussion took the turn that fruit trees would not grow in the Ottawa Valley, unless on drained land. Surely there are knolls and naturally drained slopes where fruit trees would grow if planted, and flourish too. The fruit trees which I saw in the orchard of the Hon. James Skead seemed to me to be doing well. They were thrifty, close-budded and fruitful. We presume that draining and shelter are two of the absolute requisites for fruit growing in this region. Mr. Skead informed me that he had planted apple trees some hundreds of miles up the Ottawa Valley, that they did not succeed well, yet they grew, their non-success being partly for want of drainage and shelter, and care, as sometimes, the fences being left down, the cattle injured the trees. In the most exposed quarters the finer varieties of our magnificent crabs would undoubtedly do well. They are no mean substitute for the finer kinds of fruit when these latter cannot be grown. In the neighbourhood, I noticed a remarkable growth in the half matured plum. The stone in the fruit had entirely disappeared, and the whole flesh had become like "untimely fruit." We should have much liked to have heard of the whys and wherefores of this singular freak. Can any of our wise and learned cultivators suggest a remedy? Speculation here seems to be of little worth, unless we can be instrumental in bringing forward some remedial measure. The late Mr. Robinson, of Gloucester, first pointed out to us this remarkable malformation. What can be done in the way of remedy? And who is to do it? Perhaps, if our able co-adjutor Mr. Bucke took up this subject he might be able to throw some light upon it; a successful cultivator himself, we look to successful men to bring success to others.

On the way home from Ottawa to the west, a Committee visited the grounds of Mr. P. C. Dempsey, Albury. The object was to inspect his seedling grape vine. This seedling is all that its originator claims for it—a cross, I think, between the black Hamburg and Hartford. It is a very remarkable hybrid not only of itself, but for its likeness to its congener, a hybrid from the same parentage by Mr. Haskins, Hamilton. The fruit of both were shown at London last year, and elicited the unqualified praise of the Committee on seedling fruits. In the words of an eminent grape culturist in the United States, they are of first rate promise. Mr. Dempsey's labours are to be somewhat recognized, as they justly deserve by the dissemination of his seedling in the course of a year or two. We look forward to the time, when through the liberality of the Government, our Association will be in a position to substantially remunerate the labours of all our hybridists, by bringing the diligent results of their labours into public notice, and somewhat adequately recompense them for their expenditure of time and trouble.

Your President, and seedling fruit Committee, have had several samples of fruit submitted to their inspection, during the summer and fall. I owe a deep debt of gratitude to Mr. Peter Murray, for his valuable efficient help in the discharge of my duties on this Committee. We are in a position to recommend to the directors to grant a reward for some of these seedlings, and honourable for others.

The seedling hybrid raspberries of Mr. Saunders, of London, retain their character, fame and excellence—notwithstanding the intense heat and drought of the past summer. Your

directors have taken steps that these fruits shall be widely disseminated throughout the Province by the agency of your Association.

A remarkable seedling strawberry has been brought to your attention by Mr. Biggar, of Drummondville—a report of which will be found in your transactions for the year. These, along with a beautiful seedling gooseberry, from Mr. William Stokes, Mooretown, which will bear honourable comparison with the Whitesmith, have been received, and all are seedlings of great merit. Official reports, and the rewards of the seedling Committee, will appear in due time.

It is more than time that I should bring my address to a conclusion. I never feel more out of place than when I do my humble endeavours to discharge my duty to the Association, in presenting my annual address. At the very time when I desire to learn, your partiality places me in the position of a teacher. I would not be unmindful to thank you for your distinguished consideration, and to say how much I appreciate your past kindness, and I beg to assure you that I shall always treasure it in the future. You have indeed laid me under lasting obligations to do with all my might, and best ability, the duties which as a member of your Association I am called to discharge. You may always depend on my cordial assistance in forwarding the plans and purposes of your Association—the best experience, after all, which I can give you in the carrying out of the beneficent objects which you have in view.

We have put our hand to the knife, and will not look back, until through its sharp edge, whetted by your thorough acute, intelligent generalization, we, with you, will strive to make the wilderness, and the place where there is no beauty, to be glad, by our endeavours; and to cause our fellow-countrymen to rejoice, that the little hills on every side present the successful labours of the husbandman, and the orchards and gardens of our Province blossom in their luxuriance like the rose.

ROBERT BURNET,
President.

REPORT OF THE DELEGATE APPOINTED TO ATTEND THE MEETING OF THE WESTERN NEW YORK HORTICULTURAL SOCIETY, 7TH AND 8TH JANUARY, 1874.

To the President and Directors of the Fruit Growers' Association of Ontario :

GENTLEMEN,—I have to report that as your delegate I attended the annual meeting of the Western New York Horticultural Society, which meeting was held at the Court House, Rochester, N. Y., on the 7th and 8th of January, 1874.

The meeting was largely attended by the most prominent and influential fruit growers and nurserymen of the western part of the State, and in addition to these, I had the pleasure of meeting R. A. Low and T. T. Lyon, delegates from the South Haven Pomological Society of Michigan; Dr. Dunham, delegate from the Ohio Horticultural Society, as also the esteemed Secretary of our Association.

I have to express the deep sense I feel, and my best thanks for the kindness and courtesy I experienced from all with whom I came in contact, my only regret being that I was unfortunately so ill with a severe cold as to deprive me of the pleasure of taking so active a part in the proceedings as I could have wished as your delegate.

The meeting took place in the Council Chamber, and was called to order by the President, Patrick Barry Esq. One of the most prominent objects in the room was an immense floral basket, the gift of the firm of which the President is a member; it was composed of the choicest flowers, exquisitely arranged, and was, indeed, a most beautiful and appropriate donation. Love of flowers is a very marked characteristic of the people of the United States, and I trust the day is not far distant when the same may be said of the people of the Dominion of Canada. On the exhibition tables were some splendid specimens of winter pears, some of them in excellent condition, others not sufficiently ripe for testing. These, with other articles on the tables, you will find mentioned in the Report of your Committee on Fruits, &c., (on which Committee your delegate was appointed to act) hereto attached.

REPORT.

Your Committee beg to report that Messrs. Ellwanger & Barry have placed on exhibition twenty-one plates of pears of twenty varieties (for names see Schedule A annexed.) The

"Jones Seedling" and "Dana's Hovey" exceed in point of flavour the majority of winter pears. The Dutchesse d'Hiver appears a very promising pear of fine keeping qualities and handsome appearance, but the specimens are not sufficiently ripe to test its eating qualities. The whole collection is very meritorious, and leads us to suppose that it is possible to have good winter pears.

H. Brown Smith, of Syracuse, shows several varieties of pears, amongst which are the Dutchesse de Bordeaux and British Queen, of very excellent flavour for winter pears.

Samples of fruit and vegetables, dried by the "Alden Pneumatic process," and exhibited by D. Wing & Brother, of Rochester, are on the table; also samples of the same dried by the "Williams evaporating process," shown by the Williams evaporating company of South Haven, Mich. Both are fine samples, and show progress in this direction.

Also, a jar of canned Ganargua raspberry, of fine flavour, shown by Jones & Palmer, of Rochester.

Two samples of seedling pears from B. S. Fox, California, one numbered 111 and the other 60, are shown. The one numbered 111 is of fine size, handsome appearance and good flavour, and is a pear of much promise.

E. WARE SYLVESTER,
D. W. BEADLE,
GEO. LESLIE, JR.

SCHEDULE A.

Josephine de Malines.
Vicar of Winkfield.
Beurre Gris d'Hiver.
Lawrence.
Monseigneur Affre.
Glout Morceau.
De Lamartine.
Dana's Hovey.
Louis Vilmorin.
Homewood.

St. Germain.
Souvenir d'Esperin.
Winter Nelis.
Doyenne du Ciercle.
Beurre d'Aremberg.
Rallay.
Jones's Seedling.
Beurre Easter.
Duchesse d'Hiver.
Duchesse d' Bordeaux.

The Society, being not merely pomological, embraces in its objects a very wide range, as a glance at the Standing Committees annually appointed will show. These, with the office bearers for the current year, are as follows:—

President.—P. Barry.

Vice-Presidents.—S. S. Graves, H. E. Hooker, C. L. Hoag.

Executive Committee.—W. C. Barry, S. B. Yale, John J. Thomas, T. C. Maxwell, E. Moody.

Committee on Native Fruits.—J. J. Thomas, Charles Downing, W. C. Barry, George S. Conover, W. Brown Smith.

Foreign Fruits.—George Ellwanger, T. C. Ellwanger, I. H. Babcock.

Nomenclature.—Charles Downing, P. Barry, D. W. Beadle, George H. Ellwanger.

Entomology.—H. T. Brooks, E. W. Sylvester, E. W. Herendeen and Mr. Saunders, of Ontario.

Ornamental Plants and Trees.—Geo. Ellwanger, W. S. Little, T. C. Maxwell, G. Zimmerman.

Garden Vegetables.—E. S. Haywood, John Craine, J. W. Gray.

To Report on Quantity of Fruit Shipped from Western New York.—C. L. Hoag, E. W. Sylvester, T. G. Yeomans, C. S. Cole, O. C. Chapin.

Ornithology.—G. S. Fish, H. S. Brooks, E. W. Herendeen.

Botany.—W. C. Barry, J. J. Thomas, D. W. Beadle, C. M. Hooker.

Committee to Select a Secretary and make arrangements with him to attend to the duties.—J. J. Thomas, E. S. Hayward, J. B. Jones.

Subsequently, P. C. Reynolds, Horticultural Editor of the *Rural Home*, was elected Secretary-Treasurer of the Society.

The following Reports from Standing Committees were read, and will be found of much interest and value to lovers of Horticulture, and well worthy careful perusal:—

REPORT ON NATIVE FRUITS.

Cross Apple, from Maryland, raised by Robert Cross, of Tighlmon-ton, large, showy, of good quality, valuable and profitable in that section for an early market and family of its season, from the middle of August to the middle of September.

Zachery Pippin.—A chance seedling on the land of John Burbank, Belgrade Maine, which came into notice the year Zachery Taylor was inaugurated. It is a large striped apple, ripening in November and December, and commands a high price in the markets of that neighbourhood.

Starkey.—From Vassalbor, Maine, on the farm of Moses Starkey, who writes that the tree is a vigorous grower, a regular and good bearer, and highly esteemed in that locality as a profitable market apple, as well as for house use; fruit medium size, striped and splashed with bright red on a yellow ground; tender and juicy, with a mild subacid flavor; ripe October to February.

Southern Porter and Wyllie's Favourite.—Received from Dr. A. P. Wyllie, of Chester, South Carolina, which, he informed me, originated near that town, and have proved valuable and profitable for that neighbourhood, both ripening in September and October. That specimens received were of good size and excellent quality.

Northfield Beauty.—A seedling of the yellow Siberian crab, raised by Leonard D. Cady, Northfield, Vermont. The tree is said to be hardy, vigorous, and productive, well suited to a cold climate, and unequalled for culinary uses and good for the table, and so I would think, judging from the specimens received, which were of medium size, or two inches or over in diameter, of a rich scarlet red colour, on a whitish ground, ripe the last of September.

Sarah.—Origin, East Wilton, Me., on the farm of John Tufts, where it is said to be a valuable and profitable market variety, as well as for family use: tree hardy, vigorous, and productive; fruit large to very large, shaded and mottled with light and dark red on a yellow ground; flesh tender, juicy, brisk, sprightly, subacid; ripe in October or November.

Mathews.—A chance seedling on the farm of Hugh Foster, Nelson County, Va., near the base of the Blue Ridge Mountains, and not far from where the celebrated Pilot apple originated. The specimens sent us by John Dollins, Greenwood Depot, N. C., were of excellent quality; and he writes that it is strictly a family apple, being too tender and delicate for market.

McKinney.—A new late-keeping apple, which promises to be valuable as a late market variety; tree vigorous, forming a large, round head, bearing large crops alternate years; fruit of uniform, medium size, deep yellow, often with a shade of brownish red in the sun, and of good quality. It originated on the farm of Luther McKinney, Crawford, N. Y.

Longworth's Red Winter.—This was received from William Longworth, Dubuque, Iowa, and he informs me that it is a seedling of his, and is a very hardy, vigorous tree, producing good crops annually; fruit of medium size, yellow, shaded, striped and splashed with rich red; flesh tender, juicy, mild subacid, having a slight, peculiar quince-like flavour; ripe November to February.

Golden Dixie.—This comes from James Fitz, of Ravenna Township, Virginia, and he states that it is one of the best summer apples of that section, ripening about the time of Summer Queen; tree vigorous, form in a perfectly symmetrical cone, without pruning, an early and abundant bearer alternate years; fruit medium, golden yellow; flesh a little firm, crisp, juicy, with a rich, sprightly subacid slightly aromatic flavour.

Carver's Winter.—Specimens received from James Truitt, Quincy, Kentucky, who says that it originated near that place, and is a promising late variety for market on account of its good size, profuse bearing, and long keeping; fruit medium or above, yellow, striped and splashed with bright rich red; flesh rather firm, juicy, sprightly subacid and vinous.

Burlington Pippin.—Origin uncertain, supposed to be Burlington, Vermont; not a new variety, but one highly esteemed in that locality. It is said to resemble the Fameuse in the growth of the tree, fruit, &c., and may be a seedling of it. The tree is hardy and bears abundantly of fair fruit. Specimens of fruit sent me were of good size, handsome, and of very good quality; ripe December and January.

Wythe, or Illinois Greening.—A. C. Hammond, from whom we received specimens, informs us that it originated on the farm of Rodolphus Chandler, near Warsaw, Ill.; and that the tree is perfectly hardy, a strong grower, and the best bearer and most profitable tree in his orchard, and will keep to March or April; fruit of medium size; colour rich red in

stripes, and splashes on a whitish ground ; flesh tender, crisp, juicy, lively, subacid and aromatic.

Bunker Hill.—Luther Griswold, who kindly sent me specimens of this apple, writes that it originated in the orchard of the late Dr. Paige, of Dryden, N. Y., and that it was highly prized where known ; the growth and qualities are all that can be desired, ripening in October ; fruit of good medium size, whitish yellow, rather faintly striped and splashed with light and dark red, flesh tender, juicy, subacid, vinous and of very good quality.

Sweet Mother and Berkshire Spy.—Two new seedling apples raised by Ashael Foote of Williamstown, Mass., both of which, so far as tested in tree and fruit, promise to be an acquisition. The Sweet Mother in appearance is much like its parent, but it is a late keeping, sweet apple, and valuable for its long keeping and culinary uses ; the other is of medium size, deep yellow, with a shade of bright red where exposed to the sun ; flesh tender, juicy, with much of the flavour of the old Westfield Seek no-further—an early winter variety.

Brilliant.—A new Kentucky apple which originated with S. F. Thomas, near Springfield, Ky., from whom we received specimens. Mr. Thomas states that the tree is a vigorous grower, an early and regular bearer, and the very best cooking and eating apple ; fruit medium to large, pale yellow, somewhat waxy ; often shade of pale red in the sun ; flesh tender, juicy, pleasant subacid and of very good quality ; ripe September and October.

After taking the chair, the president expressed a wish to add a little to the report of the committee on native fruits. He then referred to the Fox seedling pears of Californian production ; also to the Clapp seedlings. The latter are fine looking fruit, but, excepting a single variety, are of rather indifferent quality. The exception referred to would, in the opinion of the speaker, create a sensation among pomologists in a short time. Mr. Barry also alluded to the Rickett grape, of which he entertained a favourable opinion, which was coincided in by Mr. Thomas.

Mr. Hooker recommended the Brighton grape.

REPORT OF THE COMMITTEE ON FOREIGN FRUITS.

George Ellwanger, chairman of the Committee on Foreign Fruits, reported as follows:—

In submitting the report on Foreign Fruits, the Committee would respectfully say that but few new valuable varieties have been fruited the past year.

The following pears have proved of more than ordinary merit, and were reported at the last session of the American Pomological Society:—

Beurre Samoyeau.—Medium size ; skin yellow, with a red cheek ; flesh buttery and juicy ; last September and first of October.

Madame De Desportes.—Medium size ; skin yellow with reddish dots ; flesh melting and juicy ; September and October.

Abbe de Beaumont.—Medium size ; skin greenish yellow, marbled with russet ; flesh melting, juicy and very good ; August and September.

Eugene Appert.—Medium size ; roundish ; skin rough ; brownish yellow ; flesh melting ; sweet ; perfumed ; delicious.

Rolmaston Duchess.—Medium size, pyriform ; skin dull yellowish green ; flesh fine ; very juicy ; melting ; vinous ; very good ; October.

APRICOTS.—*Early Moorpark*.—Medium size ; very early and excellent ; July.

Alberge de Montgamet.—Medium size ; early ; with handsome mottled red cheek ; juicy and very good ; tree very hardy ; July.

RIVER'S PEACHES.—*Early Victoria*.—Size of early York ; fine flavour ; 1st September.

Princess of Wales.—Very large and beautiful ; its color cream with rosy cheek ; melting, rich and excellent ; 1st September.

Early Silver.—Large, melting and rich ; juicy, and of first quality ; early in August.

Plums.—*Reine Claude Range*.—Small, round, purple ; size of green gage ; flesh green ; juicy, with the rich green gage flavour ; September.

Jodoigne Green Gage.—Size and form of good green gage, beautifully marked with purple ; fine quality ; September.

SHIPMENTS OF FRUITS.

Mr. Hoag, from the Committee on Shipments of Fruits, reported that for want of completed statistics, he had been unable to prepare a full statement of shipment during the past

year. He could give, however, the official figures of barrels of apples shipped by canal from all points between Syracuse and Lockport, the number being, inclusive of those sent from the cities named, 467,000 barrels. As to the counties separately, he stated that two of these, Niagara and Monroe, had shipped in all 350,000 and 486,000 barrels respectively by rail and canal. His Committee would report, he said, in favour of the appointment by the executive committee, of a local committee in each county to collect statistics of shipments annually to be transmitted to the Society.

A resolution to this effect was adopted.

REPORT ON ORNAMENTAL TREES AND SHRUBS.

Mr. Ellwanger also presented the following report of the committee on ornamental trees and shrubs:—

In presenting the Annual Report of new and rare ornamental trees, shrubs, etc., and also of those varieties better known and entitled to more than ordinary consideration on account of their particular adaptability in rendering our homes cheerful and pleasant, and our country more beautiful and inviting, we wish especially to direct attention to what is, unfortunately, but too much neglected—the planting of ornamental trees and shrubs, a thing within easy access of all, even the most humble; and whose benefits are shared, not only by the present, but also by the generation to come.

A home is hardly a home, despite the many attractions that may be within, unless something without, with its cheering presence, serves to add to its attractiveness as well. From the rose bush or flowering shrub, distilling incense from each opening bud; the Virgin's Bower or ivy vine, that weave their intricate net-work around the porch, to the shade-tree that offers its leafy umbrage to the passer-by, or the evergreen that, even in winter, suggests warmth and bids defiance to the chilling blast.

Trees are without, what pictures and works of art are within. They clothe nakedness; they relieve the eye; they are a never-ceasing wellspring of pleasure that but endears itself as age sets his footprint on the decaying branch and withering bough.

Who, in the recollections of his early home, were he fortunate enough to have passed his younger days surrounded by sylvan charms, has them not impressed upon him all the more vividly from the associations that old trees carry with them? Apart from the infinite variety of form, size and shape assumed by trees, their variance is none the less striking in their manner of fruitage, their dissimilarity in habit, and their diversity in the colour of foliage, and gorgeous tints.

Nor must we forget the exquisite apparel that clothes our trees in autumn. Their annual tribute to the passing year, as well as the effect produced by the different coloured berries and bark of many of our trees and shrubs in the winter, such as the *pinus*, (the flamingo of the swamps) the *viburnum*, *oxycoccus*, the family of the *euonymus*; the different varieties of the *berberry*; the coral-coloured berries of the mountain ashes; amber-hued rind of the golden willow; the lustrous red bark of the dog-wood; and the silvery sheen of the birch. With all these means at his command, it becomes, so to speak, an easy task for one imbued with a love for the beautiful, as manifested in these—nature's most varied specimens of handiwork—to produce, with little judicious attention, almost any desired effect in landscape gardening; and by the planting of but a few trees and shrubs, to give an entirely new aspect to one's surroundings.

On the other hand, while trees serve so materially to beautify and embellish, they offer incentives equally as great in a pecuniary point of view to those who will incur the trifling labour and expense that attend their planting and early care.

The man who has surrounded his home with these objects of refinement and beauty reaps his own reward, not only in the individual gratification which cannot fail to ensue therefrom, but equally as well in the advanced value that always accompanies this small labour and outlay.

While we do not wish to savour of egotism, and while we acknowledge its many shortcomings, we would call attention to our own fair city of Rochester, and ask what renders it so attractive to the stranger who enters its leafy precincts? Walk down its shaded streets, its closely planted avenues, pause before its spacious and well-cultivated yards that surround so many of the houses of both rich and poor, and the reason is at once manifest.

Walk along the leafy avenues of New Haven, where the pride of our forests—the American elm—waves its lithesome branches in many a graceful curve over the head of the passer-by; and grateful for the welcoming shade, one instinctively murmurs a benediction on the providence of those whose seed sown, now brings forth its fruits a thousand fold.

We will here take occasion to call attention to the effects that may be produced by a proper assortment, either planted singly or in groups, of those varieties which present as great a diversity in the color of their foliage or flowers. With, for instance, a bed of *Magnolias* (the light flowering Chinese), or the scarlet Japan quince in the foreground. What an array of colour can be formed with a background of *Forsythias* in their yellow dress, or a group of *Judas* trees in the full glory of their pink habiliments.

And a little later in the season what contrasts can be made by a proper placing of the different colored hawthorns, *Philadelphus*, the *magnolia soulangeana*, the many colored lilacs and the host of other flowering shrubs.

Then the white linden, the *virgilealutea*, the birches, the *chionanthus virginica*, the snowball and the many other light barked and white foliaged or white flowering trees adapt themselves wonderfully in contrasting with and heightening the effect of the numerous red flowering and darker foliaged trees.

These deciduous trees fulfil well their mission during the spring, summer and early autumn, but in winter, if we would have an eye to the picturesque in color, we must call into requisition the well-filled category of deciduous trees and shrubs, of which some have already been enumerated, that distinguish themselves for the heightened colour of their bark or the brightness of their berries; or, what is still more beautiful, when frosts and snows surround us the varied and numerous brilliantly-foliaged evergreens, which retain their tints when everything else in nature has shed its leaves or has become brown and seared by the colder temperature.

The yew elegantissima, the varieties of the new golden arbor vitæ such as the *Semper Aurea*, *Peabody*, &c., &c.; the different varieties of the silver foliaged evergreens, like the *Juniperus Venusta* and *Virginica Glauca*, with the darker-foliaged conifers interspersed here and there to form the contrast, can be made if placed with an artistic eye, to shed sunshine on the wintry landscape and envelop it with a mantle of cheerfulness and warmth.

It is gratifying to observe the improvements that have taken place within the past few years in the planting and subsequent cultivation of fruit trees. If we take the trouble to observe, we will find, that as this branch of rural improvement is developed, refinement, intelligence, happiness and prosperity are its invariable results.

Equally, if not in a more measurable degree, does this hold good with the planting of ornamental trees and shrubs.

Then let us each and all do our part; and let everyone who has a place or yard, however small, plant it with some of the many beautiful trees and shrubs that he can select from, thus contributing to his own comfort and happiness, improving the taste of those around him, and ministering to the welfare of all:

GEORGE ELLWANGER,
Chairman.

I append herewith a list of new and rare ornamental trees and shrubs, and I have also made out a list of such varieties that suggest themselves as best adapted for the improvement of small places and yards;

NEW AND RARE DECIDUOUS TREES.

Acacia Viscosa Bella Rosea—Flowers delicate flesh-coloured, fringed with yellow; fine dark foliage, and vigorous grower, A very desirable variety.

Alnus Firma—A thrifty medium-sized tree from Japan; foliage resembling a Morello cherry—very distinct.

Alnus Incana Laciniata—A very choice beautiful variety; leaves deeply cut.

Alnus Japanica—A very distinct Japanese variety, with cherry-like foliage.

Pyrus Malus Carneæ Plero—A beautiful variety with flesh-coloured double flowers.

Fagus Quercifolia—Resembles the fern leaved; distinct cut foliage; a dwarf grower.

Æsculus Hetorphylla Dissecta—Leaves deeply and finely cut ; a very novel and attractive variety.

Æsculus Memmingerii—Beautiful white spotted foliage, curious and ornamental.

Tilia red fern leaved—Foliage deeply cut, the bark on young growth rose coloured.

Acer Wiers cut leaved—A rapid grower, shoots slender and drooping, in habit about as graceful as the cut-leaved birch—The foliage is abundant, silvery underneath, deeply and delicately cut, the leafstalks are long and tinted with red on the upper surface. We believe it will rank among the most interesting lawn trees, and may be easily adapted to small places by an occasional cutting back, which it will bear to any degree as well as a willow.

Quercus pedunculata laciniata—An elegant tree, foliage deeply cut, one of the best cut-leaved trees.

NEW AND RARE EVERGREENS.

Biota Semper Aurea—A new variety of the Aurea, which retains its golden tint the year round. So far it has proved hardy with us. A desirable acquisition.

Juniperus oblonga pendula—A native of Japan, of drooping habit, distinct and ornamental.

Juniperus Chinensis Aurea—Young's Golden Juniper—This is no doubt the most distinct and beautiful of all the yellow or golden conifera, a vigorous grower.

Juniperus Venusta—Foliage of a beautiful glaucous green colour, erect and rapid grower. This is one of the handsomest Junipers we have seen.

NEW AND RARE DECIDUOUS SHRUBS.

Deutzia Crenata Flore Alba.—A very fine profuse flowering shrub—flowers pure white, fine and distinct.

Hydrangea Japonica Alba—A charming shrub, flower of delicate rose colour changing to white.

Hydrangea Macrocephala—Very large individual flowers, petals white, turning white to rose as they acquire age.

Hydrangea Otaksa—Foliage of a beautiful deep green. The plant produces immense trusses of rose coloured flowers in profusion ; free bloomer.

Lilac Alba Grandiflora.—Very large pure white trusses. The finest white lilac.

Lilac Coerulea Superba.—Flowers light purple in bud, but when fully open, a clear blue ; truss very large ; the finest of its colour in cultivation.

Lilac Ville de Troyes.—Dark purple ; large panicle ; fine.

Spiraea Fontenaysii.—Vigorous and free bloomer ; large panicles of white flowers.

Weigela Gustave Mallet.—Red flowers ; very showy ; free bloomer.

SELECT LIST OF DECIDUOUS ORNAMENTAL TREES FOR SMALL PLACES.

Alder Imperial.
Beech, purple (River's smooth leaved.)
Beech, fern-leaved.
Elm, Blandford.
Elm, purple-leaved.
Elm, serrated-leaved.
Linden, red-twigged.
Linden, white-leaved.
Acacia Bessoniana.
Ash, aucuba-leaved.
Cherry, large double, flowering.
Horse chestnut, double, white.
Horse chestnut, red flowering.
Maple, purple-leaved.
Maple, Norway.
Oak, pyramidal.
Oak, scarlet.
Virgilea Lutea.

Apple, double white flowering.
Kolreuteria Paniculata.
Judas tree.
Laburnum, English.
Magnolia conspicua.
Magnolia speciosa.
Magnolia soulangeana.
Magnolia norbertiana.
Magnolia tripetala.
Mountain ash, oak-leaved.
Peach, double white.
Peach, double crimson.
Sweet gum.
Thorn, double white.
Thorn, double scarlet.
Thorn, Paul's new double scarlet.
Willow, rosemary-leaved.

SELECT LIST OF WEEPING DECIDUOUS TREES.

Ash, European, weeping.
 Beech, weeping.
 Birch, cut-leaved.
 Birch, elegans pendula.
 Birch, Young's new weeping,
 Cherry, dwarf weeping.
 Cypress, glyptostrobis pendula.

Elm, Camperdown.
 Elm, rough-leaved.
 Linden, white-leaved weeping.
 Mountain ash, weeping.
 Poplar, grandidentata pendula.
 Willow, American weeping.
 Willow, Kilmarnock.

For evergreens we refer to Mr. Maxwell's full and able report of last year.

SELECT LIST OF FLOWERING SHRUBS.

Altheas, double blue.
 Altheas, double variegated.
 Almonds, double pink.
 Almonds, double white.
 Calycanthus Floridus.
 Cornus mascula, variegated.
 Currant, double crimson.
 Deutzia crenata.
 Deutzia gracilis.
 Filbert, purple-leaved.
 Forsythia fortuneii.
 Forsythia viridissima.
 Honeysuckle, pink.
 Horse chestnut, dwarf white.
 Hydrangea, paniculata grandiflora.
 Lilac, Chinese white.
 Lilac, sanguinea.

Lilac, Glory of Mount Hope.
 Prunus trisloba.
 Purple fringe.
 Quince, Japan white.
 Quince, Japan scarlet.
 Spirea, Reevesii robusta.
 Spirea, fortuneii.
 Spirea, callosa alba.
 Viburnum lantanoides.
 Viburnum plicatum.
 Syringa, double flowering.
 Syringa, pubescens.
 Weigela, alba.
 Weigela, Hortensis Nivea.
 Weigela, Gustave Mollet.
 White fringe.

SELECT LIST OF CLIMBING SHRUBS.

Ampelopsis, American ivy.
 Aristolochia Siphocampyl.
 Clematis, European sweet-scented.
 Clematis, Azurea grandiflora.
 Clematis, Jackmanii.
 Clematis, Prince of Wales.
 Honeysuckles, Chinese.

Honeysuckles, halliana.
 Honeysuckles, monthly fragrant.
 Honeysuckles, Magnevillea.
 Wistaria, Chinese purple.
 Wistaria, Chinese white.
 Wistaria, magnifica.
 Wistaria, crutescens alba.

GEORGE ELLWANGER,
Chairman.

Colonel Brooks, chairman of the committee on entomology, being absent, Dr. Sylvester was called upon, and after remarking that he had not expected to be present, said he had brought together a few facts on the Phylloxera, an insect which proved so destructive to the vine in Europe.

REPORT ON ENTOMOLOGY.

It will be remembered by those present at the last annual meeting, that your entomological committee gave an account of the extensive injuries to foreign vineyards by the insect called the Phylloxera. It was thought by some, at the time, that the name Phylloxera was applicable to a plant, and not to an animal; but the subsequent discussion and developments have proved that the term is applied to an insect scarcely visible to the naked eye, but needing the microscope to certainly ascertain its presence.

Neither in Gray's Manual of Botany, his Structural and Systematic Botany, nor in the Natural History of the State of New York, can the name be found as applied to a plant.

It is supposed by European vine growers that the Phylloxera was carried from this country to Europe on American vines, and it seems there to have found a climate and soil adapted to its rapid propagation, and the loss sustained by vineyardists can be counted by millions of dollars.

For some unknown cause the development of the Phylloxera has not been so rapid in this country ; but in the opinion of your committee it has been more extensive than generally supposed. Many single vines, and small vineyards that have been planted have grown "small and beautifully less," until they have perished. The failures have been attributed to bad vines, uncongenial soil, severe winters, feebleness of the variety, or some other of the thousand and one causes which have suggested themselves to the vineyardists and their friends. Now, is it not probable that in many of these cases of failure the Phylloxera has worked unbidden and unseen at the roots of the vines and cut off from the canes and the leaves the natural food of the vines !

Certain it is that in almost every convention where the failure of different varieties has been discussed, the seeming facts have strangely conflicted, and we have been left in doubt and bewilderment ; while it may be the microscope would have developed the hidden mystery, and the whole would have been as patent as the noon-day sun. Let us learn experience from the past, and in the future look carefully for this hidden enemy in all cases of failure. We shall be the more ready to do this when we reflect that a cheap and practicable remedy has been found, by which the Phylloxera can be destroyed by wholesale. True, the experiments so far, have not been so extended as to prove the fact beyond all question, but they have been extensive enough to command our confidence.

It would extend this report beyond appropriate limits to detail here the experiments and success in destroying the Phylloxera in Europe ; but your committee design in brief to state the facts of the case and refer the society to the experiments of Messrs. Monestier, Sautand, and D'Ortoman, as reported by Gaston Bazille, vice-president of the agricultural society of Herault, and translated by the able state entomologist of Missouri, Charles V. Riley, and published in the New York Weekly *Tribune* of October 8th, 1873, and the *Rural Home* of October 8th, 1873. As it is supposed every horticulturist of Western New York preserves a file of the *Rural Home*, a reference to the article is all that is needed here.

First. The remedy is sulphuret of carbon. Three holes about two and one-half feet deep are made near the vine, and about one ounce of the liquid poured in each hole, and the hole instantly closed at the surface. The gas immediately permeates the soil and destroys the insects. One precaution has been found necessary : not to sprinkle the fluid on the surface of the ground, for the vapor of the sulphuret is death to the vines, while underneath the ground it is death to the Phylloxera and health to the roots.

Second. The sulphuret of carbon, according to Turner's Chemistry, is sometimes called the Alcohol of Sulphur, and is easily made by heating in close vessels, iron pyrites with one-fifth of its weight in dried charcoal, or by transmitting vapour of sulphur over fragments of charcoal heated to redness in a porcelain tube. It will be seen that it will be both cheap and easily made, when you know how.

Caution.—It is highly inflammable, and in connection with a pipe or cigar might make lively times for the operator.

Third. Experiments.—A single row was selected in a vineyard where all the vines were diseased with the Phylloxera, and treated with the sulphuret of carbon. Ten days after the row was examined by Mr. Bazille, roots dug out entire and no Phylloxera found, and new rootlets had commenced forming. Another experiment was made by selecting a rectangular piece of ground containing 100 vines badly diseased ; this insecticide applied, and after seven days Mr. Bazille had twelve vines dug up and found eleven entirely free from Phylloxera, and it appears probable the carbon had not been applied to the other vine.

Later experiments by different individuals seem to prove that the sulphuret of carbon is a specific for the Phylloxera.

It has been thought by some that the gall-like excrescences seen sometimes on the grape leaves, is only a different form of attack by Phylloxera, but further observation is necessary to establish this point.

E. WARE SYLVESTER.

Mr. Beadle of St. Catharines remarked after the reading of the report, that a commission of vine growers had visited this country, to discover if possible, why we are exempt from the ravages of the Phylloxera. Its members had come to the conclusion that this insect was here preyed upon by another, and was thus checked in its spread.

Mr. Hayward, from the committee on new garden plants, made a verbal report relating to a new variety of tomato, which was not an acquisition as far as his experience went. It is called the Canada Victor. The General Grant and Hathaway's Excelsior were the best varieties in his opinion. The latter was smooth and round and ran even. It ripened thoroughly, and had but one slight defect. He thought the Trophy an entire failure, unworthy of cultivation, ripening only on one side and cracking badly. As to potatoes, the Late Rose, although not new, was a fine variety, about as good in quality as the Early Rose, and his had yielded better. He got the variety of Mr. Rice of Troy.

A member said it would be well to distinguish this from Campbell's Ohio Late Rose, which was a great failure.

Mr. Hayward read a criticism on the Canada Victor tomato, showing its fancy price and utter worthlessness.

H. E. Hooker answered a question of Mr. Quinby's, in relation to the Marblehead squash. He had grown it and the result was satisfactory. His family had been well pleased with the variety.

The following were the subjects decided upon for discussion :—

First.—The cause or causes of the decline of certain varieties of fruits and vegetables in districts and localities where they have formerly been grown successfully.

Second.—The treatment of the soil among fruit trees, especially in orchard culture.

Third.—The winter protection or care of grape vines.

Fourth.—The winter protection of raspberries and blackberries.

Fifth.—The most profitable varieties of apple, pear, peach, cherry, plum, grape, blackberry, currant, raspberry, strawberry.

Sixth.—Planting dwarf among standard pear trees ; can it be recommended.

Seventh.—Pruning trees at time of transplanting ; to include evergreen trees.

Eighth.—The most suitable evergreen trees for hedges, screens and belts for shelter.

Ninth.—The best deciduous hedge plant.

Tenth.—The best season for planting hardy fruit trees and deciduous ornamental trees and shrubs ; also evergreens.

Eleventh.—Is it likely that the demand for wood suitable for the manufacture of paper will justify land owners in planting their moist wastelands with trees adapted to this purpose?

Twelfth.—Which are the best six and twelve varieties of hardy roses for general cultivation ?

Thirteenth.—Which are the best twelve deciduous trees ? The best twelve flowering shrubs ? And best six evergreens for small lawns ?

Fourteenth.—Which are the most appropriate trees for the embellishment of small cemetery lots ?

Fifteenth.—Which varieties of tomato, sweet corn and peas, are the best for the family garden ?

Question sixth was not debated, and only that portion of the tenth question which relates to evergreens. With regard to the latter the months of May and August were decided to be the best seasons for transplanting evergreens.

The answers to the twelfth, thirteenth, fourteenth, and part of the fifteenth questions, were handed to the Secretary in writing, and your delegate regrets that he could not obtain an abstract of same, the limited time preventing it.

The thirteenth and fourteenth questions are touched in the report of the Committee on ornamental trees and shrubs.

Most of the questions were fully discussed, and your delegate begs to submit herewith, extracts from the most valuable and interesting speeches delivered on the occasion.

The first subject for discussion, namely, that referring to the causes of the

DECLINE OF VARIETIES,

was then taken up. The president, in announcing the topic, and by way of illustrating its

purpose, said we knew the Virgalieu pear was a variety which had declined at the seaboard twenty years ago, was now a total failure here and still prospered at the West. The decline of varieties was attributed to various causes. Some claim, as was maintained in a paper read before the American institute farmers' club, that it was due to a long course of propagation by grafting and budding; others said the cause was in the soil or in a change of climate. It was therefore a subject capable of discussion.

Mr. Thomas was called upon for an opinion, and began by saying that the pear referred to had proved productive in some localities and not in others during the same years. Last year he had taken specimens of the virgalieu from one tree which were sound and handsome. He believed it was useless to attempt a discovery of the reasons why varieties declined if they did decline, and thought the question really was whether our fruits generally were as good as when the country was new. His own opinion was, that no deterioration had taken place. Those who maintained the opposite were misled by their imagination. The cause of their preference was the same as that which led to the praises bestowed upon a variety of wild grape from the Rocky Mountains which he had seen transplanted in Col. Corris's garden, Philadelphia. The men who first tasted these grapes had just crossed the plains, and it was no wonder they went into ecstasies over the first they had tasted for many months. He himself, never put viler, sourer, or worse fruit in his mouth, than these very grapes. There might, however, be a deterioration in fruit because the soil had been allowed to deteriorate. Heavy soils had settled three inches or more, and vegetable matters had passed out leaving the residue compact—a hindrance, which under-drainage would remove. Another cause of trouble was the increase of insects, for whom our orchards had offered tempting food. We had invited them in by the increase of fruit culture, and must now fight them as best we could.

Mr. Lyon, of Michigan, said the Virgalieu was still successful there. It cracked slightly, however, and was not so popular as some other varieties. There was already a slight indication of that decline which the variety had so fatally experienced at the east.

Mr. Hayward thought the Virgalieu was improving here. This year the variety had been perfect whether from dwarf or standard trees.

Mr. Fowler knew a tract only two miles from this city where the Virgalieu had never failed from scab till two seasons since. He had thought at first that this was because the orchard was on the east side of a hill and therefore sheltered. But as the crop had failed year before last, the reasoning fell to the ground. This season the fruit had again proved sound.

Mr. Craig thought the scab which had spoiled the Virgalieu was, like the fire-blight, periodic—both were due to atmospheric causes,

Mr. Beadle had heard an entomologist say that if at any time, there was trouble with fruit, a bug was at the bottom of it. He wanted the committee on entomology to look at the Virgalieu pear, as it might appear after all that an insect had caused the mischief in this case.

Mr. Brooks had never shipped better pears of this variety than during the present season.

Mr. Jones was of the opinion that budding and grafting had nothing to do with the decline of varieties, and another member thought that the Virgalieu pear tree had been attacked by a cryptogamous plant. An examination of the leaves had led him to this conclusion.

H. E. Hooker thought the evidence that fruit declined was very inadequate. We certainly had less success for a time with certain varieties, but there was no proof, for instance, that a good specimen of the Bartlett was not as fine as ever. There was an advance, and a permanent one, in fruits. A variety propagated from grafts and buds was stable, it preserved all its original excellence. But when raised from seed the matter might be altogether different. In all other cases, variation in excellence was owing to unfavourable years, insects or other similar causes. Vegetables, grains and grasses, being raised from seed were liable to decline, however, from want of care in preserving the best seeds, &c. He maintained, finally, that there was no evidence of intrinsic decline in fruits, and if so, then the present discussion was useless.

Mr. Quinby referred to vegetables, and said there was no doubt of the running out of varieties. The old Pink-eye potatoe, for example, had declined in quality as well as quantity of yield. The same was true of the Mercer, and even the Early Rose did not now bear as well as when introduced a few years back.

The President arose to explain that by the word "decline," as applied to fruits in this topic, it was the intention to convey the idea that certain varieties were no longer profitable to grow.

No one would plant the Virgalieu now for profit, or the Flemish Beauty. Was the unprofitable nature of the crop due to the exhaustion of soil, or to climate or age? If to age, then why were new varieties often attacked, and soon rendered useless as a market crop?

Dr. Sylvester thought that decline was caused neither by old age nor manner of propagation. Twenty-two years ago he had set out an orchard of 100 Virgalieu standard trees at an after loss of several thousand dollars. The crop at that time was selling at a high price. No defects had appeared here, and this induced the venture. But the disease had slowly approached from the east. The fruit had first cracked then fungus appeared, and he had been eventually forced to graft over all the trees in his orchard. That this was not a good plan, he was now convinced. The disease, whether fungus or insect, was inherent in the tree. But half of his grafts had been successful.

A member observed that the disease was transported on main lines of communication, and to prove this view cited that in the out-of-the-way district of Sodus the Virganeu had prospered eight or ten years after the failure of the crop in this part of the State.

Mr. Smith, of Syracuse, wished to state a fact which might have value. He had an orchard which was subject to annual overflow. Of the varieties in that orchard, Virgalieus, Seekels, Flemish Beauties, &c., he has never found any imperfect from the diseases which often attacked the same varieties on dry ground.

The President differed with Dr. Sylvester upon the results of grafting on Virgalieu stocks. He had grafted over a large number of trees of this variety with perfect success. The grafted fruit never showed the slightest symptom of the same disease except it was in varieties similar in nature to the original stock.

Dr. Sylvester asked Mr. Barry if the latter had grafted on dwarfs, and receiving an affirmative answer, said his were standards.

Mr. Barry replied that he had grafted on both and found the Virgalieu the best of all stocks in every respect; it would seem, he added, that the Buffam was a good stock, because a strong and rapid grower, but it was inferior to that which Dr. Sylvester condemned.

Mr. Coddington remarked that he had an idea the season for Virgalieus was coming round once more, and he believed the time was approaching when we should have as good crops as ever of this variety.

Mr. Lyon of Michigan asked if the Flemish Beauty had failed here, and was informed by the president that it had, like the White Doyenne.

H. A. Langworthy thought the discussion had turned long enough on pears, and therefore referred to apples, which in his opinion were not so good as in former years. The codling moth was doing incalculable damage and we did not know what to do with it.

He was interrupted by the pertinent question whether the apple crop of 1873 had not been the largest ever known.

Messrs. Quinby and Hooker instanced the Newtown Pippin as having regained within a year or two its old reputation.

Mr. Ellwanger thought that the influence of the weather when the trees were in bloom, should not be overlooked in this discussion. If the weather was cold and wet at that time, the pollen was destroyed.

At this point the president suggested that the society proceed to the discussion of the second question, namely, that relating to the

TREATMENT OF ORCHARD SOILS.

This, he said, was an important topic, as it lay at the foundation of success. There were various theories about it. While the trees were young it was generally agreed that the ground should be cultivated and kept mellow; but many said it was better to sow down afterwards with grass.

Mr. Thomas was of opinion that the soil should be kept mellow only in new orchards. The depth of cultivation might be one or seven inches, indifferently. One caution only should be used, and that was not to cultivate to any depth while the trees were growing. He had seen a four-acre orchard lot in New England ploughed so deep that four cart loads of roots had been drawn away afterwards. This was done early in the spring, and apparently without detriment. In older orchards the speaker recommended closely grazed grass and top-dressing; yet he had seen orchards flourish when cultivated. It was therefore impossible to lay

down an unbending rule. Men should act according to circumstances and according to the condition of the trees. To say what should be done with an orchard without seeing it, was the same as prescribing for a patient without visiting him.

Dr. Sylvester was, like Mr. Thomas, an advocate of grass in orchards. He always applied a covering of manure or other fertiliser in the fall, however, and with this practice he had realised from \$500 to \$1,000 per acre right along for eight years. The trees were dwarfs, sixteen years planted, and the soil was first seeded at the fifth year. He had plowed about three furrows between the rows and not even so much as that in the last two years.

Mr. Barry suggested that it would be well not to turn the trees out to grass—at least before bearing. The new grass theory was not to stir the soil at all after that.

Mr. Hooker had taken some pains to watch apple trees, and found that the best were where no plough had been, and the roots in these cases spread and approached close to the surface. He argued against the policy of plowing.

Mr. Thomas called attention to the nearness of the roots to the surface or not as an important point. If the plough were used, the former result would be prevented, while top dressing would produce it. He had found both plans successful, and did not believe it made any great difference.

Mr. Hooker asked if plant food was not at the surface.

Mr. Harris said that theoretically he believed in cultivation, but practically he allowed his orchards to remain in grass. He didn't see how the grass helped the orchard, however. Trees not in grass and not manured had produced as well in his experience as others in seeded ground and with manure.

Mr. Barry said the only advantages claimed for grass were that it kept the ground cooler in the hot season, and that it was economical.

As mulching had been mentioned by the advocates of the grass system, Mr. Fish asked to what depth it was applied. He alluded specifically to the orchard of Mr. Yeomans, which had been referred to as a notable instance.

He was informed that it had been applied to the depth of from six to eight inches, was cut out in the fall and allowed to remain.

The President closed the discussion by saying that his experience was all in favour of cultivation. You could not grow the finest fruit, such as was now demanded, without it. Men could easily allow their trees to stand in grass, in fact that was the natural temptation. They could turn them out to grass, and as soon as do that, they might grub them up at once. He had found that cultivation alone was at least as much to be recommended as grassing, even with the most unlimited amount of fertilising.

THE WINTER PROTECTION, OR CARE OF GRAPE VINES.

Dr. Dunham, of Ohio, stated that in that State they did not cultivate grapes, other than such varieties as were able to stand the cold weather. The crop of Catawba and Delaware grapes last season was almost entirely a failure, but this did not apply to such vineyards as had received proper attention in the protection of their roots; but they gave no attention to any but hardy grapes.

Mr. Harrison, of Painsville Ohio, thought that mildew was caused by over cropping.

The winter protection of

RASPBERRIES AND BLACKBERRIES

was next in order :

P. C. Reynolds, of this city had never resorted to anything for the protection of these fruit, only to see that their roots were properly covered from the frost.

J. B. Jones, of Rochester, and others engaged in the discussion, and stated that a proper covering of the roots was all that was required.

W. C. Barry, made a suggestion at this point that as the list of printed questions did not seem provocative of discussion, any gentleman present might introduce such questions bearing on the subject of Horticulture as he saw fit.

A general discussion then followed on

THE MOST PROFITABLE VARIETIES

of apple, pear, peach, cherry, plum, grape, blackberry, currant, raspberry and strawberry.

Mr. Babcock, of Lockport, thought the three best varieties of apples for shipment were Rhode Island Greening, the Roxbury Russet and Baldwin. He referred favourably also to the Mann apple.

D. W. Beadle, of St. Catharines, Ontario, stated that there was more money in the Golden Russet than in the Roxbury.

T. T. Lyon, of Michigan, said that the Northern Spy apple had originated in Western New York. He would like to hear something about it.

Mr. Babcock, stated that the Northern Spy was a good apple when carefully cultivated, but to be successful it required a peculiar soil and much care. Consequently it was not a general favourite.

Mr. Beadle, said that the Dutchess of Oldenburg, was cultivated very generally in his section of Canada. It was a fine showy fruit, and well suited for the market. He would recommend its cultivation in all northern latitudes.

Mr. Lyon, thought that the Dutchess of Oldenburg, while a very productive apple, was still unprofitable because of the fact that it ripened too early.

Mr. Cone, thought that the Rambo apple, should not be overlooked. It was a very productive apple, and if he were to plant 1,000 apple trees next spring at least 100 of them should be of this variety.

The business Committee presented a question: "Can the apple be successfully cultivated in a light soil?"

R. M. Barrus, thought that there were varieties of apples suited to the different soils—light and heavy. This fact should be borne in mind by all who thought of setting out orchards.

Mr. Jones, had found the Northern Spy a good apple for a light soil.

W. C. Barry, was of opinion that any apple would thrive in light soil. Some of the best orchards in the vicinity were in such.

Mr. Jones, had information that the King of Tompkins County was an apple which it was highly profitable to raise.

Mr. Solly, stated that his experience taught him that the King of Tompkins County was in every way a good apple.

Mr. Bogue, thought that the Twenty Ounce apple should receive more attention. He had found that it was a favourite with eastern buyers.

PEARS.

Mr. Babcock named the Bartlett, Duchess D'Angouleme, Buffam, Louise Bonne and Beurre d'Anjou as varieties of pears which had been proved highly suitable for the market.

Mr. Thomas, of Union Springs, desired to mention the winter Nelis variety of pears. He said that although a beautiful fruit they were unreliable.

Mr. Barry spoke of the Beurre d'Anjou, Dutchess, Lawrence and Beurre Clargreau as very profitable varieties. He was very favourable to the Lawrence.

Mr. Jones had been informed that the Buffam variety of pears was very popular in central New York, and met with a ready sale.

Mr. Graves, the chairman, states that the Beurre Bosc variety was one of the best that could be cultivated for the market. It always met with ready sale.

Mr. Beadle joined in the eulogium pronounced on the Beurre Bosc. It had always given satisfaction.

W. Brown Smith, of Syracuse, expressed a belief that the Beurre d'Anjou was one of the best varieties of pear. If he was compelled to make a choice of one kind he would choose the Beurre d'Anjou.

Mr. Babcock was not willing to say that the Beurre d'Anjou was a good bearer. He thought that some time would have to elapse before its value as a market pear could be determined.

Mr. Graves had some trees of this variety, which had never failed to yield good crops for the past nine years.

In reply to a question, Mr. Shandley, of Greece, stated that the Beurre d'Anjou had brought the largest price of any pear sold in this city last season, and that was eighteen dollars per barrel.

Mr. Atwood, of Geneva, had a neighbour who had received thirty dollars per barrel for Bartlett pears last season.

Mr. Maxwell, of Geneva, stated that a fruit grower of Richmond, Virginia, received forty dollars per barrel for Bartletts in New York last season. He got them into market early and hence the large price which they commanded.

PEACHES.

Mr. Lyon thought the Early Barnard was one of the most popular varieties of peach in his State, and the Early Crawford and Smock peaches were also good.

Mr. Law, of Michigan, resides at South Haven, in the peach growing region of that State. He stated that Mr. Dykeman, who is one of the largest growers in the State, had raised some 15,000 baskets of that fruit last season. He has been noted for raising large crops, a fact due to the system of thinning out, which he adopted some time since. He also cultivated his orchard each season.

Mr. Jacques inquired whether or not the Honest John was a white fleshed peach.

Mr. Thomas informed him that there were two varieties of that peach, one white and the other yellow.

Mr. Barrus spoke favourably of the Mountain Rose, a variety of peach which had been introduced to some extent in the west.

Mr. Quinby spoke unfavourably of the Hale peach, of which he had a poor opinion.

Mr. Sylvester said that although the Hale ripened so early that one half of the crop would decay yet the other half could be sold at such a price as to make their cultivation profitable.

The subject of

CHERRIES

was next taken up.

Mr. Hoag, of Lockport, had a preference for the American Heart, which he considered one of the best cherries for the market now cultivated.

Mr. Le Valley, of Niagara County, raised a variety of cherry known as the American Heart, which he considered one of the poorest. He cultivated the Black Eagle, the Black Tartarian, the Napoleon Bigarreau, the Yellow Spanish and Coe's Transparent. He thought these varieties unsurpassed. He never picked his cherries until they were perfectly ripe. He never shipped a wounded cherry, and although he permitted the fruit to ripen fully he had found no difficulty in making his shipments. He had received fifteen cents a quart for cherries when the average market price was but three and one-half cents.

The discussion here turned on to the subject of

GRAPES.

Mr. Lyon made it a practice to cover his grapes in the winter, not that he was afraid of their being winter killed, but he had found that such a course contributed to increase his grapes. He thought very well of the Concord, Hartford Prolific and Iona grapes. For an early grape, although not one of the best, the Hartford Prolific was very generally cultivated in Michigan.

Mr. Babcock spoke favourably of the Wilder grape, also of the Delaware, Iona and Rogers' hybrid.

Mr. Hoag had some Iona grapes which had done very well so long as he covered and pruned them every winter, but he failed to do so some years ago, and since that time they had not flourished.

J. D. Long, of Williamsville, Erie County, expressed a high opinion of the Concord grape, which he had always found so be very marketable.

Mr. Babcock had found that the Salem grape did well in rich, heavy soil.

Mr. Crane, of Lockport, thought very well of the Salem.

Mr. Farley, of Union Springs, stated that his faith in the value of the Iona vine had been very materially lessened by experience.

Mr. Smith, of Syracuse, had been raising the Onondaga grape for some years and thought very highly of them. One objection to them was that they appeared to be more subject to destruction by birds than any other variety.

Mr. Shandley did not think highly of the Champion grape.

Mr. Barry inquired whether the Worden and Worden Seedling grape were identical, but no one present seemed to know.

The next question for discussion was "the most profitable variety of blackberry ; what is it ?"

Mr. Jones had been unable to discover much difference between the Lawton and Kittatinny.

Dr. Sylvester had cultivated the Black Naples Currant. He had found it a good market berry, and stood transportation well.

Mr. Barry expressed his belief that the commercial value of the currant was much underrated. He was favourable to the Victoria, Prince Albert and White grape varieties.

The Herstine variety of Raspberry was, in the opinion of Mr. Downing, too soft for marketing. He thought the Hudson River Antwerp a superior variety, but Dr. Clark did not find it an improvement on the Clark.

The question of "pruning trees at the time of transplanting, to include evergreen trees," next came up.

Mr. Hooker did not regard it as a sensible thing to prune large Norway spruce trees. The smaller varieties of shrubs might be treated in that way without injury.

Norway, Hemlock spruce and Arbor Vitæ were named as being very suitable for hedges. Mr. Smith had the highest opinion of Norway spruce for that purpose.

The Honey Locust was recommended as the best deciduous hedge plant.

The eleventh question : "Is it likely that the demand for wood suitable for the manufacture of paper, will justify land owners in planting their moist, wet lands with trees adapted to the purpose ?"

The president said that waste lands on farms could be utilized with profit for the purpose, since if the manufacture of paper makes the progress expected, there would be a great demand for the wood. The silvery abele he thought very suitable.

Mr. Jones exhibited some specimens of paper made from white poplar. The wood was worth about eight dollars per cord.

The death of J. H. Clark, a member of the society, was announced by Mr. Smith.

Ellwanger and Barry were tendered a vote of thanks for the beautiful bouquet with which they had presented the Society.

The president, Mr. Barry, expressed his great satisfaction at the successful manner in which the proceedings of the meeting had been carried out. He took occasion, on behalf of the Society, to thank the gentlemen from abroad who had taken part in its deliberations. No doubt they were amply repaid for their time and trouble.

Mr. Beadle was in favour of giving an exhibition of roses next summer. He made motion, which was carried, that the matter be taken into consideration by the executive committee.

A motion that the next annual meeting be held in this City was carried.

In connection with the subject of grapes, it should be mentioned that the "Champion" grape, which the people of Ontario are so industriously solicited to buy, met with the most unqualified condemnation.

An invitation having been given by Ellwanger & Barry to the members of the Society to visit their greenhouses, was gladly accepted by your delegate and acted on. A visit was also paid to the greenhouses of Frost & Co.

The houses were found full of beautiful plants in immense numbers, indicating the immense trade done in flowers and flowering plants in the United States.

All of which is respectfully submitted.

GEO. LESLIE, JUNR.

REPORTS OF DISCUSSIONS.

WINTER MEETING.

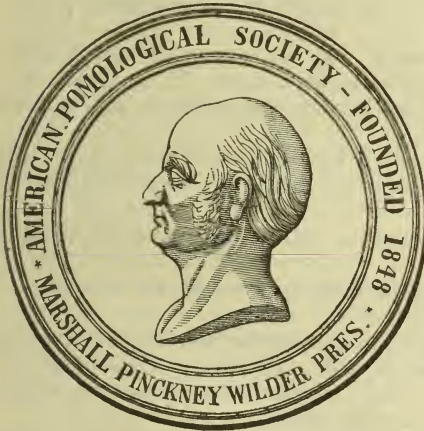
(Held at Hamilton, 19th Feb., 1874.)

At eleven o'clock the members met in the City Council Chamber. President in the chair.

Mr. E. Moody, of Lockport, N.Y., the delegate from the Horticultural Society of Western New York, being present, was invited to take a place on the platform, and share in the discussions.

The Secretary read the minutes of the last meeting, which were approved.

The President exhibited the medals which the Association had secured at the Boston meeting of the Pomological Society of the United States. There were four silver medals, and one of bronze. The silver medals were given for the best collection of open air grapes, for the best collection of plums, for the fine collection of pears, and for the whole display of fruits. The bronze was given for the second best collection of peaches. That all the members of the Association may have an opportunity of seeing the style of these medals, an engraving of both sides is given below.



The Hon. Marshall P. Wilder having sent a copy of the Transactions of the American Pomological Society to this Association, a cordial vote of thanks was accorded for his courtesy.

The following gentlemen were appointed a committee on seedling fruits:—Messrs. Holton, Moody, A. M. Smith, John Anderson and George Leslie.

The first subject for discussion was

PEAR BLIGHT,

what damage was done by it during the past season?

Bennett, of Brantford, had escaped the blight last summer.

Osborne, Beamsville, had only one tree affected, the Pratt. It was struck suddenly at by lightning.

Biggar, Winona, lost none, but his neighbour Wilson had lost a number. Trees were growing slowly, and were hardy sorts. They too were taken suddenly.

Allan Smith, of Ancaster, had none affected.

Holton, Hamilton, said that in Springer's Orchard the blight had been unusually fatal

seventy-five per cent. of the bearing trees having been ruined by it. Soil was a sandy loam; young trees in the nursery had escaped, but it had appeared among the Siberian crabs in the nursery, those growing rapidly suffering worst.

Thomas Caldwell, near Dundas, had none blighted.

Vansickle, of Jerseyville, had seen no blight in those parts.

Whiting, of Oshawa, never had but one tree struck with blight, and that was struck in the very hottest weather. His soil is a clay loam, level, but well underdrained, situated a mile and a half from the lake, with a north-west aspect, no forest to protect them. Trees were in a high state of cultivation, manured on the surface the year before planting. Trees were from six to eight years of age, and consisted of the Flemish Beauty, White Doyenne, Seckel, Sheldon, etc., etc. When planting, he dug a hole and put bones and manure, on which the trees were planted. Grows corn and potatoes among the trees.

Moody, of Lockport. Pear blight is a mystery. A neighbour of mine slits the bark of his trees on the main branches, and his trees have not blighted. He has twenty hundred bearing pear trees. A moist soil is more subject to blight than a dry. Has had more blight this season than usual among his trees.

Gray, of Woodstock. The blight came very suddenly this year. The soil is a heavy clay, with a clay subsoil.

Isett, Hamilton. My trees are very young, and as yet there has been little blight.

Barnes, Hamilton. My trees of the Louisa Bonne de Jersey suffered most. They were growing very rapidly. Have slit the bark every season till last year, and then had more blight than ever before.

Woolverton, Grimsby. The year before last I lost a great many. Last season but very few. Believe them least subject to it when grown on dry clay loam. The Flemish Beauty suffered very much with me.

Col. McGill, Oshawa. My pear trees have escaped, but not my apple. My Baldwin and Spitzenburg suffered much. My soil is a sandy loam, with a clay subsoil and rolling surface. Pear trees in the county have suffered a good deal, not excepting the Flemish Beauty.

A. M. Smith, Drummondville, had very little blight last year. Soil sandy loam, subsoil stiff clay, rolling ground. He asked if any member had known the Clapps' Favourite to blight.

Munro, Hamilton, had a good deal of blight this year. Slow growers seem not to be so subject to it.

Foster, Flamboro', grows his pear trees in sod in a sandy soil, washes his trunks with soda, and has had no blight.

Hyslop, of Ancaster, has grown pear trees for forty years, and the first blight he ever experienced occurred two years ago, and then it was pretty bad. But the past season it was very bad. The Glout Moreceau suffered the most. The Duchess D'Angouleme not at all. Soil is clayey, located on the side of a hill, trees not growing rapidly.

Brooking, Ancaster. The blight was not so bad the past year as the two previous. Tried slitting the bark. When trees arrive at the age of twelve or fourteen years then the blight is the worst. Little or none from four to eight years of age. The Sheldon blights badly. Had seen none on Clapp's Favourite as yet, but had had the tree only three years. The soil was well cultivated.

Forsyth, West Ancaster, on clay soil, and sub-soil, had no blight in his pear trees, but some in the apple trees. Carpenter, of Saltfleet,—his trees are growing about a hundred yards from the lake on a gravelly soil, with clay sub-soil. Planted fourteen or fifteen years ago, did well until last year, then they blighted—their growth had not been forced. Trees of the Sheldon and Seckel escaped.

Smith, of Winona, has not noticed the blight until lately. Had lost trees of the Flemish Beauty and Bartlett by blight. They were highly cultivated. Lost one that was growing in sod. His old seedling pear trees stood the best.

Horning, Watertown, had no blight for the past two years among his standards, but had some among the dwarfs.

Bauer, of Hamilton, lost some of his trees entirely two years ago, but the past year lost only some branches. His trees are fourteen years old. Thinks well of the use of the alkalies as fertilisers, because they neutralize the acids in the soil.

Boulton, Ancaster, has seen no blight, except in one tree, and that died outright.

Blagden, Carlyle, lost one tree with the blight, the year before last, but none last season.

Lewis, of Winona, has had but very little blight, none among the young trees, the older trees had suffered a little. Pears not extensively cultivated as yet. The surface is alluvial, subsoil clay, the trees do best on the red clay. The growth on that red clay is moderate—has twenty pear trees on that red clay, two of which blighted last summer, they have been planted eight years.

Roy, of Berlin, says the blight is not prevalent in his neighbourhood. The soil is a tenacious red clay. The Osband's Summer, and Glout Morceau flourish to perfection there. With them the pear trees suffer in mid-winter at snow line, when a bright sunny day succeeds a hard frost. Then injury is shown by a black mark. Extremes of climate affect the trees more than difference of soil. They are most healthy when grown on the top of the hills, in hard clay. Those growing in the depressions of the surface, suffer most from the cold. The injury occurs in the part of the tree where the sap is active. There is a great difference in the hardiness of the different varieties of pear. But after an experience of eight or ten years, names the Rostiezer, Osband's Summer, Glout Morceau and Flemish Beauty as hardy. The frost in the fall sometimes injures the tree at the root, and if the sap is started in the winter, and suddenly checked, death is sure to follow. He succeeds in growing the Beurre Bosc, by top grafting it upon some hardy variety, thus escaping the injury at the snow line, which was sure to kill the Beurre Bosc. Berlin is about 1,500 feet above the level of the sea.

Arnold, of Paris. No blight last season in all sorts of cultivation.

Fenton, of Brantford, planted the white Doyenne fifteen years ago. In 1872 the top branches blighted. In the fall he cut them off, and manured with salt and ashes. Has had no blight since. Soil black loam. Four years ago he planted a dwarf Flemish Beauty, and it has borne well.

Dempsey, of Albury. Very little blight the past year. In 1871 had a great deal. Has two orchards, northern exposure, one he manured very highly, applying forty cords, and a half a ton of bone dust, mixed with ashes to the acre. In 1872, he had no blight. Cold in the winter has affected many of the trees. He had lost 70 trees of the Flemish Beauty by the blight. He had tried an application of two barrels of salt to the acre, in 1872-3, and had no blight since. The Clapp's favorite stood the best of any, others blighted all around them. They have been growing 6 years. Had no blight in the Rostiezer, Kirtland, Mount Vernon or Seckel.

Sing, of Meaford, was not aware that pear trees had suffered from blight in his section—thinks the water on the north a great protection. It is a fine fruit country, producing apples, peaches and plums in perfection.

Bowslaugh, of Grimsby. His trees are on sandy soil, and quite healthy, did blight a little some three or four years ago.

Durand, Niagara. planted his trees seven or eight years ago. In 1871, two-thirds of them died of blight. The Flemish beauty and Louise Bonne did not blight. The soil is a sort of gravelly sandy loam. Four years ago he planted some more pear trees on a hard clay, they have not blighted yet.

The President thought there had been a good deal of blight the past two years.

2. What varieties of plum are least liable to rot, and what are the best methods of preventing rot?

Morse, of Nelson, has no rot, his trees grow on dry and wet soils, his kinds are Blue Gage, Imperial Gage, McLaughlin, &c.

Osborne, Beamsville, has a little damson which has done well, without rot.

Caldwell has no rot, nor black knot.

Hyslop, Ancaster, has found the Washington to be very subject to the black knot. Smith's Orleans has done well on clay loam no rot in the fruit. Some in the neighbourhood complain of the rot. His varieties thrive best on a stiff clay, and clay loam. The common Orleans and Smith's Orleans, are the best varieties with him.

Gray, Woodstock. His damson plums have escaped the rot, while his Magnum Bonums, and other large sorts are much affected, knows of no remedy.

Bennett, Brantford. Lately, within the last four or five years, there has been a great deal

of rot, formerly had no trouble from this cause. He grows the Shropshire damson, General Hand, Smith's Orleans, &c., &c.

Barnes, Hamilton. No rot nor black knot.

McGill, Oshawa, grows some fourteen or fifteen varieties; they all suffer from the rot. This year is no exception. Clay loam is the best soil for plums. The Munro rots the least. He has no curculio; he cuts off the black knot and puts it in his stove. Large and showy plums are in good demand. His own soil is a sandy loam.

Fenton, of Brantford, is troubled seriously with the black knot. His only cure is to cut and cut and cut away. He finds that leached ashes, heaped around the collar of the tree, will keep out the borer.

Lister, Hamilton, with some labour saved his plums from the curculio, by jarring the trees.

Lewis, Winona. Plum trees suffer badly from the black knot in all soils.

Geo. H. Mills, Hamilton. Plum crop in the vicinity of Hamilton is not to be depended on. They suffer not only from curculio, but from the rot, which is the most severe when there is a heavy crop.

Roy, Berlin. All varieties suffer more or less from the rot, particularly those varieties which produce their fruit in clusters. He thinks the rot is caused by punctures made in the skin by the curculio, those plums which have a thin skin, drop in a few days after they are stung, and cause no damage to the remainder of the crop. Those varieties which have a thick skin continue to hang on the tree until they are nearly ripe, then decay commences at the punctured spots, and spreads over the plum, and is communicated to those surrounding it. He values the Imperial Gage very highly as a market fruit, being satisfied that more money can be made from that variety than from any other. Glass's Seedling Plum does not grow in clusters, and on this account does not suffer from the rot. He makes more money from the cultivation and sale of plums than from any other fruit.

E. Shaver—agrees with Mr. Roy that there is more money in plums than in any other fruit. The Green Gage has not rotted with him, nor is it much stung with the curculio.

Dempsey, of Albury, mentioned Prince's Yellow Gage, Yellow Magnum Bonum, McLaughlin, Victoria and Pond's Seedling, as among the most profitable varieties; gathered six bushels from a Victoria tree, sent them to Ottawa and received \$5 a bushel for them. The best soil he has, is heavy soil. Sandy soil is favourable to the curculio. Imperial Gage grows in clusters, and consequently suffers from the rot. The Lombard bears very heavy crops every other year. The Bradshaw is a sparse bearer. Very few persons grow plums tho' many have the trees. Price ranges from four to five dollars.

Moody, Lockport, has seventy varieties in bearing; is not troubled with the curculio. Those varieties which have thick foliage, which remains on the tree until the fruit is ripe, do not rot. Those that lose their leaves early, before the fruit ripens, do rot. Ickworth's Imperatrice is a late sort but very fine. Bradshaw does well. Lombard is very profitable. Black Knot has gone by with us, there has never been any in the orchard. Plums often sell in the New York market at ten dollars per bushel, which is too high. The sale of fruit in the County of Niagara, N.Y., has made money more plenty during the past winter than ever before, notwithstanding the panic. There has not less than one million two hundred and fifty thousand dollars been received from fruit the past season in this county.

Arnold, of Paris, could never get a crop of Ickworth's Imperatrice—only a few, but these were of fine quality.

Bauer, Hamilton, thinks highly of the French Prune.

Fenton, Brantford, finds the French Prune very subject to the black knot and borer.

Bennett, Brantford, does not gather the prunes until the snow comes. Values them highly for canning. Trees bear well.

Arnold, Paris, wished to mention to the members that he had tried the much lauded Wild Goose Plum, and could say that the tree is a very poor bearer, the fruit of very poor quality, ripening very late; it will probably keep a very long time, if from no other reason than that nobody can be found to eat it. He wished to say to the members present and absent, that agents are travelling through the country selling this plum tree at the modest price of a dollar and a half per tree.

Question 3. Grape. The soil, preparation of it, pruning and training the vine, and winter protection.

Osborne, Beamsville. Any soil that is good for raising Indian corn will grow fine grapes,

with the same preparation that any farmer would give in order to raise 75 bushels of corn to the acre.

Arnold, Paris. His preparation of the soil would depend on the quantity of land he intended to plant. If he were growing grapes for wine, he would pursue the primitive plan, and let them take care of themselves. If he were raising samples for exhibition he would prune, though severe pruning often injured the life of the plant.

Haskins, Hamilton, thinks the American grape vine is very different in some respects from the European, and will not bear such short pruning, and believes that this is the opinion of the most experienced American vineyardists. If Rogers' No. 15 is pruned close, it will give only poor bunches, and these very likely covered with mildew, but if allowed to grow freely it will yield bunches weighing 1lb. each.

Moody, Lockport. His neighbour, Mr. Ringeburg tills the ground thoroughly and deeply, as a preparation before planting, then plants his vines, and does not allow the roots to come to the surface, but keeps all surface roots pruned off; this is an old European method, and seems to do well. This vineyard is on a heavy soil.

Biggar grows his vines with roots near the surface, keeps the ground mellow and clean, but cultivates *shallow*, and has very good results. He only pinches back in summer. He prefers this to summer pruning. He prunes in spring, and thinks the little bleeding a benefit. If pruned in fall the vine is very apt to kill back from two to four inches, which necessitates a second pruning in spring. He prefers to do it all at one time.

Dempsey, Albury, in his climate must prune in the fall, so as to lay the vines down upon the ground, and keep them there. He can rely upon the snow to protect them sufficiently. He finds that with the roots near the surface, the fruit is finer and of better flavour, both in grapes and pears. He cannot ripen the Isabella nor the Iona. Of the Rogers' hybrids, he prefers No 44, but does not like the peculiar effect which continued eating of them produces upon the tongue. Concord does not do well with him. The bunches are poor, and the fruit scarcely of second quality. It does best on limestone soil.

Haskins, Hamilton, thinks shelter on the north and west very important.

Bagwell, Hamilton. The Isabella ripens by the 1st September. Rogers' No. 15 has good bunches, the Salem is his favourite. Iona not worth growing. He prunes in March.

Eager, Hamilton. The winter of 1871-2 killed his vines to the ground; in 1873 he had a fine crop. He does not give his vines any protection. Thinks highly of the Concord, Rogers' No. 4, Diana, and Delaware, and for wine, prefers the Clinton.

Matthew Bell, Hamilton. He prunes in the double arm system. Has fine crops of fine fruit prepared the ground thoroughly, and manured with lime and ashes. Has ground low, with a clay subsoil. The Rogers' varieties were trained on the west fence, but they died.

Woodley, Hamilton, thinks very highly of the Eumelan. It is hardy and of fine flavour. He dug a trench six feet wide, and three feet deep, filled it with surface soil, mixed with bones and ashes, and afterwards top dresses with ground bones and ashes. Thinks highly of the Walter.

Lister, Hamilton, exhibited some grapes in fine condition. These had been packed in dry leaves, and kept in a place quite cool, but free from frost. In pruning he uses his judgment, and adapts his method to the peculiar habit of the vine.

Mr. Moody, of Lockport, gave an interesting account of the fruit-growers' operations in Western New York. He said that several years ago those who had gone largely into the planting of fruit trees were a little afraid that they were overdoing it, and that so much fruit would be raised that it would be a drug in the market, and prices would fall below the cost of producing it. After a thorough test, their experience had been the very reverse. There seems to be no cessation in the demand for the best qualities of fruit. Mr. Moody stated that one variety of pears last season brought ten dollars per bushel in the New York market. He told the fruit growers of Ontario that in Western New York they had not the least fear of overdoing the fruit business, that those who were the most largely engaged in it were still planting young trees, and that the great West would take all the nursery stock that could be raised for generations yet to come. The County of Niagara had received for their fruit crop the last fall and this winter, one million and a quarter dollars, and while manufacturing counties had been suffering great distress from the scarcity of money, in his county the people were strangers to poverty, and were enabled to give assistance to their less fortunate neighbours.

SUMMER MEETING,

(Held in the Town Hall, Owen Sound, 2nd and 3rd July.)

The Society was called to order at eleven o'clock, by the President. Minutes of the former meeting were read and approved. The first subject of discussion was the Apple.

Richard Trotter, Owen Sound, grows the Golden Russet, Northern Spy, Snow, Irish Peach, Rhode Island Greening, Colvert, St. Lawrence, Red Astrachan, and Early Harvest. The Early Harvest does well, the fruit is free from the black spots. Trees of the St. Lawrence are young, so far the fruit has been free from spots. Thinks most highly of the Golden Russet, Spy, and Rhode Island Greening, though the Greening is killed back in very severe winters. The three last named are valuable for market. The Baldwin when grafted in the top of other trees does well, but those that are grafted on the root do not. The Talman Sweet makes an excellent tree upon which to graft the Baldwin. The Spy does well, but is long in coming into bearing. Red Astrachan sets its fruit well. Pomme Gris does well, and the Sweet Bough. Trees obtained in the fall and heeled in over winter, and then planted in the spring, usually do well.

Jno. McLean, Owen Sound. His orchard is young, it comprises Hawthorden, Fall Pippin, Esopus Spitzenburg, and Swaizzie Pomme Gris, besides those named by the previous speaker. The Hawthorden crops well, though not every year. The Golden Russet is the hardiest of the whole lot. He is well satisfied with it as a market fruit. He has never seen any blight on his apple trees. Has seen the bark burst just above the ground late in the fall, or early in November, just before the snow fell, in the third year after planting. Thinks it is owing to their vigorous growth. They crack most on the south-west side. This occurs only in the younger trees, but the cracks are not usually sufficient to kill the tree. A few died from this cause, but the remainder are still living. He washes his trees with soft soap in the spring, which is an excellent application, keeping the bark smooth, and killing the insects.

William Brown, Sydenham Township. Many of his sorts are seedlings. Those trees which he brought from the nurseries and planted in the fall died, those planted in the spring do well. He grows the Spy, Ribston Pippin, Cayuga Redstreak, Snow, Rox Russett, Keswick Codlin, Alexander, Red Astrachan, Autumn Strawberry, Early Harvest and Baldwin. His Baldwin trees are thriving well, though not yet in bearing. Has some seedlings, which he thinks are valuable. One is very large; one is excellent for cooking. They are all winter fruit. Has had trees burst in the bark as described by the previous speaker, notably the trees of the King of Tompkin's County variety. He cures them by putting a coating of wax over the crack, covering it with rag, and then a mound of earth. They soon heal over. He did not notice these cracks until spring, so he is unable to say when they occurred; thinks they are caused by the trees growing very thriftily from being heavily manured. The cracks are straight up and down, sometimes four and five in number.

John McLean, Owen Sound, has planted one hundred and fifty Baldwins grafted at the ground, and has not a good tree remaining out of the whole number. They are much more tender than the Greening. He has planted two hundred and fifty Greenings, and, though they are a little tender, considers them well worth growing. He procures his trees in the fall, trenches them in over winter, and plants them out in spring. They all do well under this treatment.

Major Cameron, Sydenham Township, has forty varieties of apples; likes the Northern Spy the best. It is very hardy, a good general bearer, and the fruit sells readily. Values the Snow next; it does well, tree is hardy, without any spots on the fruit; has been in bearing some six or seven years. The Gravenstein does well, but it bursts in the bark to some extent. The Swaar is a very good apple, and does very well. His Ribston Pippin is just coming into bearing. Baldwin fails entirely—no summer blight. Soil clay loam, deep; trees do well, both on hill and vale.

William Holmes, Owen Sound. His trees are mostly seedlings. The seed was sown twenty years ago. There are three varieties of them now on the table, in good preservation, of full medium size, some as large as the Spy. Has one variety ripening in the fall, which received the prize for the best fall seedling. There were nine other varieties in competition. In colour it is like the Red Astrachan. He has a Baldwin tree doing well, which is sheltered by a high rock, strongly impregnated with limestone.

Alexander Fairbairn, Derby, grows a number of sorts. The longest keepers are the Greening and Rox Russets. The latter keeps better than the Spy—keeps sometimes until July. The trees are young, only nine years planted—grows also the Pomme Gris, Summer Pearmain, Holland Pippin, Golden Russet, Red Astrachan, Golden Sweet, Sweet Bough, Tart Bough, Lowell, Saxon, Hawley, Alexander, Blenheim Orange, Monmouth Pippin, Seek-no-further, St. Lawrence, Snow, King of Tompkin's County, Fall Janetting, Fall Pippin, Irish Peach, Perry Russet, and Hawthornden. The Holland Pippin spots considerably, the Fall Pippin spots some. Has a few seedlings, one of them is a summer sort of medium size, conical outline, deep yellow colour, with brownish spots, flesh very firm, ripening in the end of August, just after the Red Astrachan, better quality than the Red Astrachan as a desert fruit.

W. J. Marsh, Clarkesburg, exhibited Newton Pippins in a fine state of preservation. He says that the Vandervere is the most profitable variety he grows; keeps well till the middle of May. His soil is a sandy loam with a clay subsoil. Has thirty or forty varieties. Has two varieties of seedlings, better than many of the grafted sorts. One of them has been named Marsh's seedling, by the American Pomological Society. This is a late fall sort. The other is an early winter variety. Finds the Ribston Pippin a very shy bearer. Is not troubled with codlin moth. Five years ago the winter killed some trees, killed nearly all the Baldwins, has never had but one good crop on the Yellow Belleflower.

John McDiarmid, Derby, grows the Spy, Rhode Island Greening, Rambo, Spitzenberg, Baldwin, Holland Pippin and Hawthornden. The Baldwin is a little tender. The others seem well adapted to the locality. The Spy, for all in all, is his favourite. Trees are good bearers, and the fruit keeps long and retains its flavour to the last. Pomme Gris keeps well, but not so long as the Spy, never finds any worms in the fruit, but has been troubled with the bark louse.

Thomas Scott, M.P.P., made his first plantation in 1852. It was a failure. Planted again in 1856, another failure. Tried again, subsequently failed again. 'Twas not the fault of the trees but of the soil, which was very rich, resting on a subsoil of moist quicksand. Did not try on the clay, others fail on the quicksand. Indeed all fail on that soil—a black mud surface. There is no fruit on the trees, though the trees grow. Codlin moth destroys them also.

John Creason has just planted a new Orchard. Rhode Island Greening is a little tender. The Yellow Belleflower is a little tender, though that does tolerable well. The codlin moth is troublesome, more troublesome in gardens than in farmer's orchards.

Wm. Roy, Royston Park. His trees are just coming into bearing. They comprise a number of sorts. The Red Astrachan is very fine and a very hardy tree. The Yellow Harvest cracks, has some codlin moth, has observed it in only one tree. The Golden Russet is his favourite. There are no spots on the snow apples. Soil is a rich clay loam, having an easterly and southerly aspect. The storms are usually from the south west. All varieties are hardy, except the Baldwin. The Yellow Belleflower bears profusely. His trees are low headed, which he thinks is the preferable form for that climate. The Montreal Beauty Crab, indeed, all the crabs, flourish finely.

Charles Wilkes says, the Yellow Belleflower is a great bearer every other year. A fine keeping apple, in use from January to May.

George Jackson, Durham, has Baldwin trees from sixteen to seventeen years old. They are sheltered on the east—they bear very abundantly, and the fruit keeps until April, though it is frequently affected with dry rot. He paints his trees with crude petroleum. The Rhode Island Greening does not yield much fruit, though it has a good crop this year. The fruit of the Northern Spy is very fine, has noticed the splitting of the bark as noticed by others, and that it occurs on the south side. Soil is a clay loam, the subsoil limestone. The trees stand on high ground. He could save much trouble to intending planters in the selection of sorts from his own experience by recommending to them to confine themselves to the Golden Russet, Spy, Baldwin, and Rhode Island Greening. Snow apple is troubled with codlin moth.

W. A. Stephens, Owen Sound, has not been successful, the soil is gravelly, the bark louse has been very troublesome, and entirely killed off some of his trees. He planted half an acre, but half of them died, he cannot tell why. Has had some fruit from the trees that survived.

David Christie, Owen Sound, cultivates Ribston Pippin, King of Tompkins County,

Spy, Early Harvest and Snow apple. The Snow apples are very fine. Trees very productive and hardy. His favourites are the Golden Russet, Spy, Snow and Greening. The Ribston Pippin has a good deal of blight some years, it blossoms every year, but some years produces no fruit. Thinks the blight is caused by the cold spring frosts. Notices that Wagener is affected in the same way. The Baldwin is not suited to this climate, especially when planted in the valleys. It does better on the hills.

PLUM.

Richard Trotter, Owen Sound, grows a few. This district is a very favourable place for the plum. The trees grow well, and bear well. He cultivates the following varieties, Bingham, Bleeker's Gage, Coe's Golden Drop, General Hand, Imperial Gage, Lawrences' Favourite, McLaughlin, Yellow Egg, Reine Claude de Bavay, Peter's Yellow Gage, Prince's Yellow Gage, Bradshaw, Columbia, Goliath, Lombard, Smith's Orleans, Pond's Seedling, Victoria, Washington, Orange Egg, Orange Nectarine, Jefferson, Duane's Purple, Purple Gage, Mulberry, and a few others. They all bear heavy crops. The Victoria crops very heavily, and is valuable for the market. The Yellow egg is also a valuable market sort. Understood that from four to five hundred bushels of plums were shipped from Owen Sound last year. The Lombard is good for market, Duane's Purple ships well, but does not seem to be a favourite sort in the markets. For home uses he values the Lawrence's Favourite. He is well satisfied with plum-growing. There is no curculio to sting the fruit. Has trees that have been planted twenty-two years, now nearly gone with age. The trees will last about seventeen years.

Brown has a few sorts, they do well, has a seedling, yellow, with red cheek, large size, a very fine sort. Reproduces itself from seed, it crops so heavily that the trees will only last from ten to twelve years. The fruit commands half a dollar per bushel more than other plums. The stone is small, ripe early in September. Black knot is getting bad in this neighbourhood, and killing off the trees. Has also seen rot in the Imperial Gage.

Fairbairn grows the following varieties, Duane's Purple, Victoria, Bradshaw, Washington, McLaughlin, Smith's Orleans, Prince of Wales, Goliath, Orange, Large Green Gage, Bingham, Pond's Seedling, Lawrence's Favourite, General Hand, Reine Claude de Bavay, Imperial Gage, Yellow Egg, Lombard, Bleeker's Gage, Yellow Gage, Purple Gage, Jefferson, Mulberry, and Fellenberg, the two latter are tender. He also has a small seedling, which is very sweet. The McLaughlin is a very fine plum. Bingham is rather late for the climate. Lawrence's Favourite ripens early. General Hand does well for the age of the tree. Reine Claude de Bavay is late. Imperial Gage is good for market, it does not rot. The Victoria showed some rot the year before last, and last year; he saw the rot on trees in the vicinity of that variety. It was severe. He had not a bushel where he should have had five, owing to rot. Bleeker's Gage is fine for home use; no rot in the Columbia as yet, the tree is healthy and hardy. His seedling is about half the size of Lawrences Favourite, and very sweet. His plum trees are growing upon a hill, and so far have escaped the black knot.

Marsh, Clarksburg, grows the following sorts, Lombard, Sugar plum, Yellow Gage, Lawrence's Favourite, Columbia, St. Catharine, Coe's Golden Drop, Common Blue, Washington, Jefferson, Yellow Gage, and Bradshaw. The section where he lives is very favourable for the growth and production of plums, both in soil and climate. The soil is a sandy loam, with a clay subsoil, the clay being mixed with sand. The St. Catharine is an excellent late variety. No black knot. The Lombard the best for market. Columbia has borne two years, seems firm and good for shipping. Bradshaw is also good and firm for shipping, and hangs long on the tree after being ripe. No rot.

Scott, M.P.P., has two sorts of plums that have never been attacked with black knot, but does not know what they are.

Rev. Mulholland, Owen Sound, has also a couple that are free from black knot. One of them is a McLaughlin, does not know the name of the other.

McLean, Owen Sound, has found black knot on the McLaughlin. He cultivates Lombard, Washington, Reine Claude de Bavay, Coe's Golden Drop, Yellow Egg, and Peach Plum. The Lombard is the most reliable every way. The Washington bears good crops; so do the Smith's Orleans and the Imperial Gage. Ha had some rot, but not worth talking

about. Has had considerable black knot, but this he keeps in subjection by cutting it off. Reine Claude de Bavay ripens late—never gets fully ripe. Tree is tender. Yellow Egg takes well as a market fruit. Peach Plum is not a very good bearer.

G. S. Miller, Owen Sound, cultivates Washington, Yellow Egg, small Sugar Plum and common Blue Plum. Has not had much rot, but a great deal of black knot, which has destroyed not less than seventeen trees, compelling him to dig them up.

Major Cannon has many sorts, nearly all those that have been named. Has been growing them for thirteen years. Soil is a free loam, deep, on a dry subsoil. Location in a valley. Has had some black knot, this he cuts off, and has not been troublesome. No rot. Has a seedling, large, red; larger than a Lombard, and somewhat lighter in colour.

Jackson, Durham, grows the Washington, Yellow Egg, Lombard, Orleans, Green Gage, Yellow Gage, and Imperatrice. The latter is of a very fine flavour; does exceedingly well. Has no black knot, nor curculio, nor have any of the plums rotted except those grown in dense clusters.

W. Saunders, London, has been examining Mr. Trotter's grounds, finds them exceedingly well kept—not a weed to be seen—there is about an acre, chiefly in plums; could find no curculio, but discovered some black knot. The knot is not caused by any insect, though it is frequently made the harbour of various kinds of insects. He believes it to be caused by a fungus, the spores of which ripen in July. If cut out before the spores ripen, and burned, they can be kept under, but be sure to burn them, for the spores will ripen if the knots are allowed to lie on the ground. Cover large wounds with grafting wax, cow-dung, or clay. The black knot will spread if neglected. The curculio may be expected, sooner or later, to come to Owen Sound. Mr. Saunders gave a brief history of the metamorphoses of the curculio, and exhibited a bottle containing a large number of the perfect insects.

Dempsey, of Prince Edward County, said that his location was unfavourable for the growth of plum. The trees blossom only one year in four. Has plenty of curculio, and badly troubled with black knot. On clay soils the curculio is less troublesome than on sandy. The blossoms of the Victoria are not killed so badly as many others. Prince's Yellow Gage is healthy and prolific. He has also a sort of prune one-third larger than the German prune, which will keep well, is not liable to rot, and is seldom stung by the curculio; though on a light soil it is not a heavy cropper. The Lombard is less injured by the curculio than the Washington. He had a large crop last year, but it was the first in four years. Advises a testing of various sorts with a view to ascertain the best for market. Thinks the Victoria a good market sort.

Arnold, of Paris.—The Washington does not blossom in his grounds, save one tree which is sheltered by the barn. He feels almost disposed to sell out and move to Owen Sound, and go into the cultivation of plums. The Yellow Egg is very tender at Paris.

Saunders, London.—The Washington fruits well with him, though he is only sixty miles west of Paris. Victoria is one of the best for shipping. The fruit is large and showy, and has a firm flesh and tough skin, yet it seems to do well at Owen Sound, even better than in London. Prince's Yellow Gage is not suitable for market. The Lombard suffers the least from curculio of any sort. Light coloured sorts usually suffer most.

Col. McGill, Oshawa.—Most varieties do well in his neighbourhood, but they are very much troubled with curculio, especially the light varieties. The Yellow Egg and Lombard are popular and profitable. His soil is a light, sandy loam.

Arnold, Paris, finds Prince's Yellow Gage profitable because it is early, but he finds it impossible to get plums to a distant market without picking them when they are quite green.

Dempsey would like the Owen Sound growers to try the German Prunes for shipping. 'Twill dry well.

Sing, Meaford, cultivates the Blue Plum, Washington and Yellow Egg. The Blue Plum is the variety principally grown, of which many bushels are shipped to distant markets. It carries well, and last year brought from two dollars to two dollars and a half per bushel.

William Roy, Owen Sound, said that the ruling price in Owen Sound was a dollar and a half per bushel.

The President advised the passage of a law to compel plum growers to gather all their fallen plums, and to cut off, and burn the black knot.

GRAPES.

William Roy, of Royston Park, grows Roger's No. 15, 4, 3, Concord, Isabella, Hartford Prolific, Iona, Isabella, and Delaware. Prefers Rogers' 15 for flavour. He prunes in the fall, and lays down the vines. The bunches of 15 are compact but small, berries are large, sets its fruit well. His second choice is the Isabella; the vine is a little tender, but a very good bearer. Bunches very compact. The Iona does not ripen, and is exceedingly tender. His Rogers' No. 4 ripens earlier than his No. 3. The Delaware ripens well. The Isabella ripens once in a great many years. The Concord ripened in the summer of 1872, but not in that of 1873.

D. Christie values the Northern Muscadine for its earliness. It is very foxy, and the fruit drops from the bunch. Ives' Seedling ripens next in order, it is black in berry and bunch small. Hartford Prolific is larger, both in bunch and berry, but has ripened the last three years after the Ives. Rogers' No. 15 is a fine sort. Adirondac is too tender. Concord ripens too late. He prunes in the fall, and throws the canes on the ground for the winter, when they are sufficiently protected by the snow. His soil is a clay loam, well under-drained.

Jno. G. Francis, Post-master, Owen Sound. The Isabella does not ripen early enough, only once in about three years. The Eumelan ripened on the 15th September, 1872. All varieties ripened poorly last year.

Dr. Campbell, Owen Sound, has a sheltered location; ripened the Eumelan last year. Did not prune his vines neither in fall nor spring for the last two years, but pinches back the young shoots in the summer. The Hartford Prolific ripens after the Eumelan. The Hartford Prolific remains on the trellis all winter, trained against his house, and is not injured by the cold. The Clinton berry is improved in flavour by a slight frost. The Concord and Clinton ripen in his ground.

McLean and Francis, Owen Sound, find Eumelan perfectly hardy, and consider it a very valuable grape.

Marsh, of Clarkesburg, said the Clinton was perfectly hardy, and generally ripens its fruit two years out of three. It ripened last year; has a vine seven or eight years old. He gives it no care, and it produces about 200 lbs. of fruit a year. The Isabella, trained on the south side of a house, ripens some fruit.

RASPBERRIES.

Trotter, Owen Sound, says they are very little cultivated. C. Wilkes cultivates some, such as the Franconia, they are never winter-killed; fruit well, and much superior in flavour and in size to the wild. They are not affected by any pests.

Saunders, London, had this morning seen the saw-fly, and found the softer parts of the leaf eaten out. The orange rust had appeared on some raspberries. A sample was exhibited.

Marsh, Clarkesburg, had noticed that the frost had injured his canes—the red and white Antwerp.

Saunders, London, called attention to profitable varieties of the Raspberry. Brinckle's Orange stands at the head. It is tender in some sections, and therefore not much cultivated. Here at Owen Sound it would do well, being protected by the snow. Franconia is the next best. Belle de Fontenay crops well in the fall, and so does Marvel of Four Seasons. The Red and Yellow Antwerp do not always succeed up with us. We cultivate the Philadelphia, because it is hardy and a great bearer. It is much larger than the wild, and is an excellent market berry, selling well. Arnold's new seedlings are very promising. He has one which is a very fine red fruit, and another of a yellow colour, Hybrids between the Hornet and Arnold's Orange King. Saunders has also some Hybrids between the Philadelphia and Doolittles Black Cap. The Philadelphia is increased by suckers, the Black Cap by rooting at the tips of the young branches. He hopes to prolong the raspberry season by some of his varieties. The flavour of his Hybrids is a combination between the Philadelphia and Black Cap.

Marsh, Clarkesburg, said that the orange rust had attacked the Black Cap, and also the wild varieties.

STRAWBERRIES.

Arnold, Paris, spoke of his seedling strawberry, which was a cross between Wilson's strawberry and Dr. Nicaise. They suffered very much last winter. One plant much exposed escaped unhurt, others were injured. Two years ago he would have said, plant Wilson's Albany for market.

McDiarmid cultivates Wilson's Albany, and Triumph de Gand.

John McLean, cultivates Hooker, Wilson's Albany, Boston Pine, and Colonel Cheney—likes Hooker best.

The President spoke of C. H. Biggar's seedling. That the berry was large, flavour good, prolific and hardy.

Beadle spoke of splendid fruit trees, especially of plums, which he had seen at Owen Sound. He had found no curculio, and no black knot. The apple trees were mostly young, just beginning to bear—very thrifty and healthy; many of them growing in grass and clover, reaching nearly to the waist. Could Meehan see them, he would at once refer to them as demonstration to the correctness of his theory.

The discussion being ended, Mr. Scott, M.P.P., moved that Judge Macpherson take the chair. The Judge having taken the chair, Mr. Scott spoke of the very interesting character of the discussions—of the large amount of information received, and desired on behalf of the members at Owen Sound, to tender their thanks to the President, Directors, Secretary, and gentlemen from a distance, for their kindness and courtesy and successful efforts to make the meeting pleasant in the highest degree. They had very much enjoined this opportunity of forming the personal acquaintance of so many gentlemen distinguished in pomology, and had found them as agreeable in social life as skilled in the culture of fruits.

The President made a reply—in which he most cordially reciprocated the kind expressions that had fallen from Mr. Scott, and for himself and the officers of the Association, and others from a distance, desired to thank the resident members for their liberal hospitality and gentlemanly attention. The visit of the Association to Owen Sound was marked with a vast amount of courtesy and kindness on the part of the inhabitants. Every attention that was in their power to bestow was conferred on the members coming from a distance. He enjoyed this feature of the summer meeting; and had often thought since that the example of the fruit growers of Owen Sound is worthy of imitation elsewhere. When at Boston we found the liberality and consideration of prominent members of the American Pomological Society worthy of all praise, and giving a marked character to the whole proceedings. At our summer meeting every one vied with another in showing us attention. It would be invidious to mention individual names, but foremost stood the proprietor of Royston Park, and his estimable lady. Judge Macpherson, Mr. Scott, Mr. McLean, Mr. Christie and others, rendered our visit highly agreeable, the pleasant memories of which will long prove a sunny spot in our after lives.

The Directors of the Association and members from a distance were treated to a romantic drive to Inglis Falls, and thence to Rockford Castle, where a princely collation was spread for our entertainment. The unexpectedness of this treat enhanced the enjoyment of it. The company having partaken of the good things so bountifully provided, toast, and sentiment passed freely round. Mr. Scott, the Member, made himself particularly agreeable, and proposed success to the Fruit Growers' Association of Ontario. The Rev. Mr. Mulholland had a few chaste sentences of welcome, kindly uttered—expressions of sympathy with and a fellowship in the delightful culture of the Fruit Growers' Society. The President replied, speaking of his delight at seeing several wives of the members present, who in their own sphere were distinguished for their literary and scientific tastes.

Secretary Beadle had great pleasure in being present on the present happy occasion, and hoped that the benefit to fruit-growing in the neighbourhood might prove as great and beneficial as their visit had been happy and delightful.

Mr. Roy invited the horticulturists, on the afternoon of the second day, to meet some of the gentlemen in the neighbourhood at his residence, Royston Park. Nothing could exceed the beauty of the situation of Mr. Roy's house and farm. A natural plateau affords a position second to none in the country for building on, giving a pretty outlook over the Bay to the opposite side, and a peep of Owen Sound still further in the distance. Nature has done much for the place—art more. From a very wilderness there has been excavated a beautiful

garden, advantage having been taken of utilizing the forest and rendering it subservient to enhance the planting of cultivated varieties, both of forest trees and shrubs. The garden is well stocked with every variety of fruit trees. Apples and pears do well. The Rhode Island Greening was found to be tender, but the Flemish Beauty pear, Easter Beurre, and the like, were just as large and handsome as those in more favoured, because more southern climes. Flowers formed an important culture with Mr. and Mrs. Roy, whose cultivated tastes had enriched their place with many rare and splendid varieties of shrubs and flowers. The social element in our Owen Sound meeting was a noticeable feature. Indeed, from our Boston and Owen Sound experience we can declare that this feature tends much to further horticultural interests. It is a means which is not to be overlooked of securing much valuable information on fruit interests, besides exhibiting a side of our humanity, which is all the better of being developed in connection with our special cultivation. The elevated and ennobling social pleasures which we enjoyed in the society at Royston Park, will long remain a pleasant remembrance of our Horticultural meeting there.

AUTUMN MEETING HELD AT OTTAWA.

On the 8th of September, in the absence of the President, Vice-President Arnold took the chair. Messrs. Leslie, Dempsey, and Peck were appointed a Committee on fruits.

A Committee on subjects of discussion were appointed, which presented, through their Chairman, the following Report:—

OTTAWA, September 8th, 1874.

The Committee appointed by the Fruit-Growers' Association to suggest subjects for discussion at this meeting, beg to report as follows:—

That only a part of the members of the Committee have been able to meet, and then only for a few minutes; but they would recommend as the most important questions for this Association to consider at this, their first meeting in Ottawa, the kinds of fruits most likely to succeed in this part of Canada.

The chief of the fruits which they would name for the consideration of the Association, are Apples, Pears, Grapes, Plums, Cherries and smaller fruits, with the soils best adapted for each. Any suggestions which the Association may have to make as to modes of culture, drainage, and any other questions relating to fruit-growing would be well received and might be of great importance, coming from a Society having among its members so many practical fruit growers.

J. HURLBERT,

Chairman of the Committee.

Mr. W. White, Ottawa, stated that he grows very fine Red Astrachan, and Hawthornden apples; his soil is very sandy to the depth of twelve feet. He has also fruited the Golden Russet, Pomme Grise, and Snow Apple, (Fameuse). All Crabs do well—has fruited Coe's Golden Drop, and Lombard Plums, which did well. Pears have not succeeded with him, but his experience with this fruit is very limited, having tried but two or three varieties. Of grapes, the Delaware does very well, and the Concord, so far, has ripened its fruit every year; he has not fruited the Hartford Prolife, nor tried any of Rogers' Hybrids. Exotic grapes ripen well in the cold vinery, when the roots extending into the outside border are well covered with a thick coating of coarse manure. The Kentish cherry which ripens in July does well. Small fruits of all kinds do well, with the exception of the English Gooseberry, which mildews badly.

Mr. Lees, of Ottawa, grows the Duchess of Oldenburg; it is very thrifty, perfectly hardy, and a good and early bearer. Also the Red Astrachan, which is hardy, and although planted six years, has, as yet, not proved to be a good bearer. The Fameuse does well, it is not hardy as the Duchess of Oldenburg, and suffers considerably from fire blight. The Transcendent, Montreal Beauty, Small Red Siberian, and Golden Beauty Crabs do well. The St. Lawrence does well in this section of the country. He has tried the Baldwin and Spy, they grew for two years very luxuriantly and then died. He trains his trees low, because they are exposed to sweeping winds. He had not tried any pears except the Flemish Beauty, but these were killed down to the snow line. In plums he has not found the Lombard to be hardy—has the Bradshaw three years planted, just beginning to bear; this has done well so

far. He has not succeeded with the Oxheart, or May Duke cherries. The Kentish do well. The Clinton grape is hardy—is a great bearer. The Concord does well, also have Rogers' No. 4, 8, and 15. The Delaware does well, and so far has ripened its fruit every year, except that two years ago the frost came very early, and destroyed a part of the crop. He trains his vines on a trellis, but throws them down in the fall, and covers them usually with earth, but prefers potatoe-tops. He has also usually ripened the Isabella, which he has had in bearing for five years, and finds it a large cropper. He prefers his vines to be in the open ground, those grown near a wall suffer from the thrip.

Brinckle's Orange raspberry does well. It is a fine cropper, and fruit of fine quality. The canes were not injured last winter. Have raised some gooseberries with good success, and free from mildew, although my soil is sandy—this year I saw some mildew for the first time. Currants do well, but it is necessary to keep the worms down with Hellebore.

Mr. Bucke has some apple trees, but they have not fruited, except that the Wagener received from the Association bore three specimens this year. His trees have been growing three years. The varieties are the St. Lawrence, Red Astrachan, Transcendent, Montreal Beauty, Red Siberian. The Crabs are all hardy. The apple trees suffer from some cause which makes the bark of the trunk turn black all the way from the ground to its branches, and on all sides alike. He thinks this is caused by the severity of the winter.

Dr. Bell has fruited the Red Astrachan, but his trees have been affected in the manner described by Mr. Bucke, and in consequence have all died. There is an apple tree about five miles up the Gatineau, which is perfectly hardy. It was raised from the seed; the fruit is of fair quality, something between the Red Astrachan and Fameuse and ripens in the end of September. There are also perfectly hardy apple trees in the Township of Cumberland, County of Russell, grown from the seed, and the fruit of a good market quality. A number of people are having their orchards grafted anew with these sorts.

Mr. Mathieson remarked that the Fameuse does very well in the neighbourhood, also the Duchess of Oldenburg has been found to stand remarkably well. Indeed, it is the most hardy sort. The St. Lawrence succeeds well so far, although his trees have only been planted for two years.

Dr. Hurlbert has not grown any himself, but noticed that the Duchess of Oldenburg, Snow Apple, Spitzenburg, and all Crabs did well. He is satisfied that many varieties of apple can be successfully grown here, if only sufficient attention be given to the selection of suitable sorts.

T. C. Keefer, Ottawa, has been experimenting for ten years—has succeeded well with Duchess of Oldenburg and Red Astrachan—though some trees are killed at the snow line. The Snow apple, St. Lawrence, and Spy do well. The Pomme Grise is a shy bearer. The Sweet Bough has not succeeded. The failures, he thinks, are due chiefly to lack of shelter, and want of proper drainage.

Mr. Wood, Hall's Bridge, said that the following sorts of apple do well in his neighbourhood:—Gravenstein, Ribston Pippin, Beauty of Kent, King of Tompkin's County, Northern Spy, Roxbury Russet, Red Astrachan, Duchess of Oldenburg, Early Harvest, Golden Russet, Rhode Island Greening, Cooper's Market, Hubbardston's Nonsuch, Dominie, and Swaar. These have been planted three years, and, of course, have not yet borne much fruit. The following varieties have failed:—Sweet Bough, Twenty Ounce Apple, Keswick Codlin, and Colvert—he has planted, the English Jargonelle and Flemish Beauty pears, and although they have been growing for ten years, they have not fruited yet. Plums generally do well. He has also several varieties of cherry, but does not remember their names, except that of Governor Wood.

Mr. W. C. Wells (Twelve miles North of Belleville,) Talman Sweet does well, and also the Northern Spy—though apple trees generally do not thrive with me. Pear trees do not endure the climate. They freeze down. Plums do well a few miles from me, but I have not succeeded with them. The Lawton Blackberry kills so badly that it bears no fruit. The Delaware grape does well. It ripens the earliest of any that he cultivates; he lost the crop by early autumn frost—once in eight years. It is the best market grape. The Concord succeeds pretty well; ripens nearly every year. The Isabella does not always ripen well. The Ontario ripens sometimes. The Clinton ripens well. Pears, in Huntington, a few miles to the north, do well.

W. C. Raymond, Dickenson's Landing, County of Stormont, cultivates the following vari-

eties of apple, viz :—Talman's Sweet, Snow Apple, Red Astrachan, Brockville Beauty, Blue Pearmain, Seek-no-further, Green Nonpareil, Hubbardston's Nonsuch, Fall Pippin, Sarjeant's Sweet, Pound Sweet, Roxbury Russet, Summer Strawberry, Ribston Pippin, Golden Russet, Early Harvest, Ba'dwin, Swaar, Montreal Beauty Crab. These all do well, but of 100 Red Astrachan trees, we lost five one winter by the cold. The Brockville Beauty is a very hardy tree, fruits young, and bears large crops every other year. The fruit ripens about a week later than the Red Astrachan, and, like it, ripens unevenly, not maturing the whole crop at once. The fruit will also keep a little longer than the Red Astrachan. Common plums bear for a year or two, and then die off. Have the Imperial Gage for three years, and so far has done well.

The Kentish Cherry does well. Currants, raspberries, and strawberries do well. The soil is loamy and rather stony ; about two to two and a half feet deep—subsoil, a sort of hard pan. His trees are upon a high hill, where the soil needs underdraining.

Dr Bell suggested that the people need instructions about the proper planting of trees. Mr. Bucke suggested that they need to have their attention called to the subject of underdraining, that the melting snows saturate the soil with water, which cannot get off sufficiently rapidly, owing to the tenacious character of the subsoil ; that in consequence of so much cold water in the soil, the roots of the trees cannot act properly, when the warm sunshine of April and May starts the sap in the branches.

Vice-President Arnold remarked that it was very important that their trees should be worked upon suitable stocks—that the plum trees should be grafted on the plum stock, not on peach—that cherry trees should be worked on the Mahaleb stock. If worked on this stock and branched very low, he believed that even the Heart and Biggareau cherries might be expected to fruit here. The apple should be worked on the Paradise stock, which would make of the trees mere dwarf bushes, and keep them very low—these might be expected to escape the severity of the climate, and bear a fair amount of fruit.

The Secretary remarked that the Vice-President had dwarf apple on the brain ; that he did not believe it at all necessary that the trees should be worked on the Paradise stock in order to secure proper form and size of tree—that the trees grown on the Paradise stock, made only mere bushes, which would yield but a small quantity of fruit to each tree. He believed that by a judicious selection of varieties grafted in ordinary seedling apple stocks, and proper training of the tree so as to form low heads, all that the Vice-President sought to obtain by his dwarf bushes would be accomplished, while the trees would each yield a much larger crop of fruit.

Mr. T. Forfar, Ottawa, said that the Crabs are the most grown ; after them the Alexander, Gravenstein, Kentish—Fillbasket, and Fameuse. He thinks the Spy would grow in suitable soil. The Greening has not been successful, but thinks that is owing to unsuitable soil and want of proper care. That by underdraining and the addition of lime to the soil, many varieties that now fail might be grown. He has two years' old trees of the Swayzie Pomme Grise, Montreal Pomme Grise, Golden Russet, and Tolman Sweet, which, so far, seem to be hardy. The Kentish Cherry is the only sort he has growing that seems to succeed well ; he stated that a Mr. Holland has a wild plum tree, the fruit of which is nearly as large as an Egg Plum, the skin thin, and the quality good. The Green Gage Plum grows well at Fitzroy. Grapes of the earlier varieties do well, also all kinds of raspberry and strawberry.

In the afternoon of the second day, by invitation of the Honourable R. W. Scott, the members visited his garden in the County of Ottawa, Province of Quebec. At one o'clock carriages were provided and the members, to the number of about thirty, accompanied Mr. Scott, to what some of the gentlemen were pleased to call Ottawa County's Garden of Eden.

Its picturesque surroundings, and the charming view its altitude commands, not only of the Capital, but also of the surrounding country, fairly entitle it to the name. On the way out, Mr. Scott made the time glide pleasantly by, with an interesting description of the points of interest passed ; the peculiarities of the Ottawa Valley District ; and the extent of its manufactures. Arriving at his residence, the party disembarked and were conducted through the garden, which is magnificently laid out, and covers an area of fully six acres. Mr. Scott must have experimented and labored zealously to bring his fruit to such perfection ; not only the common fruits which thrive in the soil and climate of this district, but also the finer fruits, which western men imagine cannot be grown north of Kingston, flourish in Mr. Scott's orchard and

garden with a luxuriance that astonishes many of his visitors. Not only were apples, plums and grapes of the choicest varieties shown, but also pears, &c., of excellent quality. Some twelve varieties of apples were shown, and fully twenty varieties of the most delicious grapes—many of which were ripe and others almost matured. After a walk through the garden, the party were entertained at luncheon, served up in a commodious marquee pitched on the lawn, in a princely style. There was a profusion and endless variety of choice ripe fruits, meats, cakes, ices, wines, and other luxuries which were partaken of with a zest. All appetites having been appeased, a few moments social chatting on the excellence of the fruits ensued. After these had been discussed, the Vice-President, Mr. Arnold, of Paris, briefly referred to the hospitable manner in which Mr. Scott had entertained the members of the Association, and called upon Mr. Hurlbert, one of the oldest members present, to propose a vote of thanks to the honorable gentleman. The Doctor before doing so, prefaced the motion with a few appropriate remarks, giving Mr. Scott deserved credit for the interest he had manifested in the promotion of fruit culture, and thanking him for the kindly disposition he had shown to the Association.

Mr. Beadle, of St. Catherine's, Secretary and Treasurer of the Association, cordially seconded the motion. He was surprised with what he had seen to-day, for he had repeatedly been told that the rigid climate of the Ottawa Valley and the nature of the soil would not admit of fruit being grown here. He was happy, however, to observe that such was not the case, and to learn by actually seeing, that there was as good fruit in its season, and giving as liberal a yield in this district as in any other part of Canada. He thanked Mr. Scott for the kind invitation extended to the members of the Association, and thought they would not have seen Ottawa in the aspect which was most interesting to them had they not visited his garden. He admired the indomitable energy the honourable gentleman had displayed to produce such fruit in so short a time, and the faith he had reposed in the soil to warrant the expenditure he had gone to.

Hon. Mr. Scott in reply, stated that if it were a momentary pleasure in sight-seeing to visit his residence, it was no measure in comparison to being honoured by the presence of the fruit-growers of Ontario. He too had often been told that it was an impossibility to grow fruit in the Ottawa Valley, but from experience he was impressed with the belief that the further north apples were grown the better the flavour was. He illustrated this by referring to the excellence of the Montreal "Fameuse," and other apples adapted to northern climates, which met no rival even at the European markets. He was satisfied that we could accomplish fruit-growing, and make it a success with a little care and culture. In ten years he had not only grown apples and grapes, but also pears, samples of which were now on the table. He acknowledged that his hobby was fruit-growing, and his experience had taught him that in no other part of the continent could small fruit be grown to better advantage than in the Ottawa Valley. The dwarf trees were better than the standard, because they were not exposed to the cold, as in the west, but were protected by the snow, which is a good fertilizer, inasmuch as the snow water contained large quantities of fertilizing materials. After explaining the success of the grape vine culture, he thanked the party for their kind expressions and compliments.

The gentlemen were then introduced to Mrs. and the Misses Scott, and after indulging in a pleasant game of croquet, and viewing the city from an elevation, returned to the city highly delighted with the trip.

REPORT OF COMMITTEES.

Report of Committee on Seedling Fruits exhibited at the Winter Meeting.

Your Committee have decided to award the first prize of \$10 for the best Seedling Apple exhibited, to No. 1 Spy, crossed with Wagener.

We cannot recommend the granting of a prize for Seedling Pears, there being only one variety exhibited, and that of an inferior quality.

With regard to the other Seedling Apples on the table, we would say that there are in all, twenty varieties, some of them of much merit. No. 16 resembles the Spitzenburg, and Mother in external appearance, and is a very handsome apple. It is, however, now past its prime in point of flavour. Two varieties from the neighbourhood of Brantford resemble the

Yellow and Green Newtown Pippin in points of appearance and flavour, and your Committee are in some doubt as to their being ungrafted Seedlings. No. 19 is a singular apple, some of the specimens being entirely sweet, others of a sub-acid, and others again with a mixture of streaks of a sweet and sub-acid flavour. Nos. 2, 3, and 4 are crosses between N. Spy and Wagener; Nos. 5 and 6 are crosses between N. Spy, Wagener, and Spitzenburg. They each possess points of merit, and show intelligent working in the right direction. The other varieties upon the table do not possess sufficient distinctive qualities to make them worthy of mention.

GEO. LESLIE, JR.,
A. M. SMITH,
ELISHA MOODY.

REPORT OF THE FRUIT COMMITTEE.

OWEN SOUND, July 3rd, 1874.

Your Committee beg to report that they had placed before them the following *Seedling Fruits*. Of Apples we find Arnold's No. 1, a cross between N. Spy and Wagener. Arnold's No. 2 a cross between Wagener and Spitzenburg, and Arnold's No. 3, of same parentage as No. 1. These Seedlings have been reported on at former meetings of the Association, but we would mention that Nos. 1 and 3 are in a very fair state of preservation; No. 2, too far gone. Of the flavour we cannot speak, as they have evidently contracted an unpleasant flavour from some foreign substance in the place where they have been kept.

There are also three Seedlings exhibited by Mr. Robt. Holmes, they are of small size, but apparently good keepers. Judging from their flavour, size and appearance, we could not recommend them for cultivation, being much inferior to Seedlings exhibited at previous meetings of the Society.

Of *Strawberries*, Mr. Arnold shows a Seedling being a cross between Wilson's Albany and Dr. Nicaise. Mr. Arnold says it is exhibited under unfavorable circumstances on account of the dry weather which has prevailed in his neighbourhood, and his having picked the finest berries a few days ago. The berries as exhibited are of a very fair size, and good appearance, being about the color of the T. de Gand, not so firm in texture as that variety, but by no means what could be classed as "soft." The flavour is not of a very decided character, but rather pleasant. Of its productiveness we cannot now judge. We consider it a promising variety, and should be glad to meet with it next year when at its *best*.

Of *Cultivated Fruits* there are on the table of apples some very fine, well-flavored, and excellently-preserved specimens of N. Spy. Particular mention may be made of those shown by Jas. Paterson, Jno. McLean, and A. M. Stephens. We would observe that there is a marked difference in flavor, showing, we think, that this variety is liable to vary considerably in different soils. Mr. McLean and Mr. Paterson also show some very fine specimens of Golden Russet. In the specimens a distinct difference in appearance is observable, while no variation in quality can be detected.

Mr. W. J. Marsh has placed on the table a very large specimen of Vandevere, and specimens of Cooper's Market.

Of *Cherries*, the only specimens shown from this district are of the May Duke variety, grown by Mr. Marsh, of Clarksburg. These are of small size and not yet ripe, and judging from these alone would almost show that neighbourhood to be unfavourable to the culture of the cherry.

Mr. Arnold, of Paris, also places on the table the following varieties:—Burr's Seedling, Elton, Rockport Bigarreau, Black Tartarian, and large Fruited Weeping.

Mr. Saunders, of London, shows Early Richmond and May Duke. The specimens are good, but the kinds are so well known as to need no further comment. The only other fruit on the table is a plate of "Heart of Oak" gooseberry, unripe of course, but well grown for the season of year. No name being on the dish, we cannot say who is the exhibitor.

GEO. LESLIE, JR.,
PETER C. DEMPSEY,
WILLIAM ROY,
Committee on Fruits.

P.S.—Since writing the foregoing, Mr. Brodie has placed before us a plate of Wilson's Albany, and Downer's Prolific Strawberries. The specimens of Wilson's are particularly good. The Downer's Prolific shows its usual characteristic of softness and deficiency in pleasant flavor. These specimens would go to show that the neighbourhood of Owen Sound is eminently suited to the culture of this useful and delicious fruit.

GEO. LE LIE, JNR.,
PETER C. DEMPSEY,
WILLIAM ROY.

REPORT OF COMMITTEE ON SEEDLING FRUITS.

OTTAWA, 8th September, 1874.

Your Committee have examined the following Seedling Apples—Nos. 1 and 2 Winter sorts Exhibitor unknown—Nos. 3, 4, 5 and 6, also Winter sorts exhibited by Mr. John McGill—No. 4 is a very pretty little Russet somewhat resembling the Pomme Grise, but in common with the other winter sorts, not being in season, your Committee cannot express an opinion as to their merits. These should be sent either to the Winter Meeting of the Society or to the President to be judged.

Nos. 7 and 8 are Fall varieties exhibited by Mr. Dempsey, of Albury, County of Prince Edward. No. 7 is known in its locality as the "Albury," and has the reputation of being a very hardy tree and good and regular bearer; in size it is above medium and of good roundish oval shape; in flavor it is a mild sub-acid, and taken all in all is a very promising apple.

We consider it worthy of a first prize.

No. 8 is known in its locality on Redner's Seedling, in size full medium, and in shape and some of its markings much resembling the Duchess of Oldenburg; flesh white and fine grained, flavor a sprightly sub-acid. It has the reputation of being a hardy tree, extremely and regularly productive, and is much esteemed where known. We think it will prove a very valuable cooking apple, and that it is worthy of cultivation. We think it deserving of a first prize.

Two varieties of Seedling Pears are shown by Mr. McGill; one of them much resembling the Glout Morceau in appearance, but evidently late Fall Pear. Not being yet ripe, your Committee cannot express an opinion as to its merits. The other is a very good early Fall Pear, in size below medium and of pleasant flavor. We consider it should have a first prize.

In Seedling Plums Mr. Bartlett, of Oshawa, shows a very fine variety supposed to be a cross between the Washington and Lombard, and showing markings of both these sorts; in colour it is a dark violet above medium size, a clingstone of very good quality. We adjudge it a first prize. Mr. McGill shows a very handsome Plum a seedling from the English Golden Drop; it is of a rich golden colour with a red cheek, and is of good rich flavor; it is nearly a freestone. We think it decidedly worthy of a first prize. Mr. Dempsey shows a plum below medium size, and colour of the Lombard. It is a freestone, and we think would be useful for drying purposes.

Mr. Dempsey also shows a new Seedling Grape of very great promise which he proposes to name the "Burnet," and which this Association has decided to distribute to its members in the Spring of 1878. It is a cross between the Black Hamburg and the Hartford Prolific. The fruit in size of bunch and berry much resembles the Black Hamburg, and we believe this variety is destined to take the first rank as one of our Hardy Grapes. We adjudge it a first prize.

Mr. Arnold shows a Seedling Grape a cross between the Clinton and Black St. Peters, and showing the characteristics of both parents. We think it will prove valuable as a wine grape, and should have further trial.

Mr. Arnold shows a Seedling Raspberry a cross between Hornet and Orange King. Mr. Arnold states it is hardy, and does not require protection on his grounds. Its leading characteristic however appears to be its lateness in ripening, the specimens of canes shown being now in full bearing. It is evidently very productive, but of the flavor we can not well judge after the long journey. Further trial may show it to be a very valuable introduction.

All of which is respectfully submitted.

GEO. LESLIE, JUN.,
P. C. DEMPSEY,
JAMES H. PECK,
Seedling Committee.

REPORT OF COMMITTEE ON THE FRUITS EXHIBITED AT THE OTTAWA MEETING.

- W. Graham, Gloucester, exhibited 15 var. of grapes, finely grown.
 W. C. Raymond, Stormont, 15 var. apple, including the Brockville Beauty.
 W. White, Ottawa, 3 var. crabs, 2 of apple.
 P. E. Bucke, Ottawa, 6 var. grapes, and 3 of crabs.
 S. Greenfield, one var. of crab.
 P. C. Dempsey, Albury, ten var. pears, 4 of apples.
 Geo. Leslie & Sons, Toronto Nurseries, 18 plums, 18 var. apples, 12 var. pears. A branch of cherry currants.
 T. C. Keefer, New Edinburgh, 10 var. of apples.
 R. Gowanlock, Seaforth, 12 var. of apples, 8 var. pears, 14 var. plums, 1 var. peach.
 J. Bartlett, Oshawa, 4 var. apples, 2 var. pears.
 Charles Arnold, Paris, 3 var. plums, 1 var. apple 1 of pear 1 hybrid raspberry and the Brant grape.
 J. B. Osborne, Beamsville, three var. grape, one of peach—Crawford's Early, very fine—and two of pear.
 W. Gray, Woodstock, six var. grape, six plum, one filbert.
 T. H. Parker, Woodstock, four var. grape, two of plum, one of pear.
 All of which is respectfully submitted.

P. E. BUCKE,
 JNO. MCGILL,
 J. B. OSBORNE,
Committee.

REPORT OF THE COMMITTEE APPOINTED TO EXAMINE THE "BURNET" GRAPE.

To The Directors of the Fruit-Growers' Association :

The Committee appointed to examine the seedling grape raised by Mr. P. C. Dempsey, Albury, from seed of the Hartford Prolific fertilized with the Black Hamburg, and named by him the "Burnet," beg leave to report that they proceeded to Mr. Dempsey's residence, and found the vine growing in his grounds without any attempt to train or restrain its luxuriance. The vine is evidently very vigorous and healthy, the leaves are deeply lobed, thick, downy underneath, and at the ends of the shoots quite pubescent on the upper surface—the canes are stout and well-jointed—the bunches are large, generally well-shouldered and well-filled—the berries are large, oval, black, when ripe. Skin thin but strong; flesh and flavour strongly resembling those of the Black Hamburg, without the slightest trace of foxiness; seeds small; the fruit evidently more nearly ripe now than the Delaware growing alongside, and though not so darkly coloured as the Hartford Prolific was much more palatable and more nearly matured.

ALBURY, 10th September 1874.

(Signed,)

CHARLES ARNOLD,
 JNO. MCGILL,
 GEO. LESLIE, JUN.,
 D. W. BEADLE.

REPORT ON FRUITS IN THE OTTAWA DISTRICT.

It appears strange that the country along the Ottawa River, although one of the earliest visited and oldest settled parts of Canada, whose banks are replete with nearly all the wild fruits which nature has bestowed upon our country with such a bounteous hand, should up to the present have received so little attention from its inhabitants with regard to the cultivated varieties. Amongst the fruits found growing wild may be enumerated the high and low bush Cranberrys, the Grape, the Plum, the Wild Currant, the Raspberry, Strawberry and Blackberry, the two varieties of Gooseberrys, prickley and smooth, and the Huckleberry.

My experience, extending over a very few years, convinces me that this region is Nature's

Paradise for the small fruits and the different varieties of crabs, and that with some amount of trouble and patient watching, the grape, some varieties of apples, and the plum, may be grown with success, at all events on a limited scale. I have tried the Lawton Blackberry and the Peach, but find these tender plants become much more so by being covered with earth in the winter, and cannot endure heaven's faintest breath on being uncovered in the spring. The Wilson's Early Blackberry does not prove so delicate, having more of the characteristics of the Raspberry, and can be brought through the winter with tolerable success by laying it down; this variety was distributed by the Fruit-Growers' Association in the spring of 1871, and I believe will be found, on account of its hardiness, a great acquisition to this part of Canada. Having thoroughly tested this locality for small fruits, my mind naturally runs in that groove, and in my western tour, quite recently terminated, I watched with much interest the progress made in that direction, and I must say I never was struck with so much astonishment at anything as I was at Mr. Saunders' success in hybridising the Black Cap with the Philadelphia Raspberry; the remarkable success he has met with is quite surprising, not only in the intimate amalgamation of the two varieties, but in the wonderful bearers he has produced by cross-fertilization. Should it, after cultivation, bear out present indications, a result will be obtained that will hand his name with a blessing down to posterity.

The Oakville Strawberry crop appears to rule the market in Canada, and certainly the proprietors of the fruit gardens there deserve much credit for the energy they have displayed in pushing the cultivation and dissemination in its ripe state of that berry. I also noticed this year in our shops the American Seedling Gooseberry, shipped from the same locality; these berries were sold here at 20 and 25 cents per quart, which must have yielded a good margin to the importers; the fact is, the middle men expect to make as much as the growers out of berries, which advances them to an unconscionable price, but by this means they cut their own throats, as they would sell three times as many if they put on half their present profits, and would not have half so many waste boxes left on their hands—fruit selling here at 20c. can be as readily obtained as in any of the more western towns at 10c. It appears strange then that some energetic man does not go into the business in our neighbourhood on an extensive scale, as I should judge a sure competence awaited him.

Coming to personal experience, I may state I have grown at the rate of \$130 worth of the Houghton seedling gooseberry on a space 66 by 99 feet, putting the berries at an average rate of 15c. per quart, a price readily obtained for them in a green state for tarts or stews, or in a partially ripe state for preserves. I am perfectly certain that a town lot of the above size, in a high state of cultivation, well under-drained, properly grown and pruned with a watchful eye for the saw-fly and measuring worm, may be made to produce \$150 worth of these gooseberries per annum at the above price, 15c. per quart. There does not appear to be any limit to their bearing, and a heavy crop one year does not appear to diminish the crop of the next. The bush is perfectly hardy, and, although I have grown many hundreds of them I never lost one from the effects of climate.

I have read, from time to time, suggestions thrown out with regard to the distribution of the filbert. I have this nut tree in my grounds, but so far it has not fruited, neither, I think, will it, as it suffers, more or less from frost every winter. I have also tried the edible chestnut, grown from seed, but the second winter left not a plant behind. The horse chestnut, however, appears to thrive well. The Butternut and Hicory are natives of the soil, though I have not noticed the shell-bark variety of the latter growing in our woods. The Black walnut and chestnut, though found wild about St. Thomas and above London, are not met with here, but the common Hazle grows abundantly.

I make no doubt the meeting of the Association here will awaken a new interest in fruit growing in the Ottawa Valley, and do much good in extending its culture.

P. E. BUCKR.

8th September, 1874.

IS THERE A DANGER OF OVERSTOCKING THE FRUIT MARKET?

This question is often asked but not satisfactorily answered.

In discussing a question of such importance, it becomes necessary to look at the principle that must govern all productive and commercial matters, which is that of *demand and supply*.

1st. Fruit is now considered a necessity in every family, the use of which with the demand is constantly increasing. 50 or 60 years ago good apples, pears and sometimes peaches were left to rot upon the ground, or fed to swine, because there was no demand, but now, such fruit sells quickly at remunerative prices.

It is reasonable to expect that the demand will continue to increase for say half a century at least, for the reason that but a small part of this Dominion is well adapted to the successful production of fruit, and nearly the same may be said of the whole American continent, for according to some calculators, only one twenty-ninth part of the continent can be classed as "fruit producing," and only three-fifths of that portion that can be considered really good.

3. The Eastern Hemisphere is little if any more favourable for fruit-growing than the Western, to which must be added immense island territories that produce none of the fruits of this latitude.

4. Assuming that the foregoing cannot be far from correct, it follows most conclusively that the demand will be very great, and the question very naturally arises, Where or how shall a sufficient supply be obtained? The answer is easy,—*Impossible at present.*

5. We are well aware that some of the small fruits, as well as such early apples as the Harvest, Early Joe, and Red Astrachan, such pears as the Madeline and others, (and perhaps peaches), that will not bear shipment to foreign lands, may be grown in such large quantities as to overstock the local market, but apples and pears of such long-keeping qualities, that will keep sound and good for six months to twelve, and will bear shipping, cannot be grown in excess of the demand.

6. It is quite certain that in this Dominion the supply cannot exceed the demand, and it is our duty and interest as true patriots and economists to produce for the wants and requirements of our own country, and in addition export, if practicable.

7th. Whatever commercial relations may exist between the Dominion and the United States, or the more distant powers, this one point is very certain, that the Fruit growers of Ontario may have the fullest confidence to plant and produce good marketable fruits to the greatest extent of means and ability, that it will prove not only a safe but profitable investment.

A. MORSE.

Smithville, Lincoln Co., 1874.

REPORT OF FRUITS AT CAMPBELLFORD.

Apples this year a failure. The cause must have been late spring frosts. There was a great show of blossoms which, however, never set.

Plums also a failure, The cause of failure here, however, was due to the overbearing crop of last year which so weakened the fruit buds and in many cases the trees themselves to such an extent, that they are now dead and dying. They made a fine show of blossom in the spring, but had not vigour left to set their fruit. In the case of young trees beginning to bear, and old trees that had their fruit properly thinned, the crop was a good one, proving that thinning fruit will pay.

Now for pears, the best fruit of all Pears have not been generally planted in this section. Where they are grown they have stood the winter as well as the hardiest apples. In the spring of 1873 I set out about 140 of the most popular sorts, mostly Flemish Beauty and Clapp's Favorite. They stood last winter like oaks. At the same time I set out of dwarf pears, one Beurre Giffard, one White Doyenne four Beurre Diel, and five Beurre De Anjou. The result was, the same season they were planted, Beurre Giffard ripened three fine pears, and White Doyenne four fine specimens, two of which, however, had a crack in them, said to be a failing of this variety. But I cured it this year as follows. Around each of my dwarfs I put about half a pailful of dry new ashes in the spring and worked them into the soil. Result this year, thirteen fine large White Doyennes as perfect and good as could be desired. three more from Beurre Giffard, and one pear from each of the four Beurre Diels, large, handsome and good. And all the trees are laden with fruit buds for next year; wood well ripened and healthy growth. A mound of earth eight or ten inches high was made around each tree in fall to protect the quince stock. I believe dwarf pears of proper varieties thus treated will succeed wherever standards will, and some varieties of standards will succeed wherever apples can be properly grown.

Cherries, a smaller crop than usual; Raspberries, good crop; Gooseberries, also good.

PLANTS RECEIVED FROM F. G. A.

Beurre D'Anjou has done well. Quite a tree now; bloomed last spring.

The Eumelan vine with me won't touch Roger's Hybrids. Like the Early Wilson and Mammoth Cluster blackberry and raspberry, McLauchlan plumb doing well. Beurre Clairgeau pear doing well. Grimes Golden pippin doing well. Clapp's Favourite pear was nearly dead when received, has sprung from root, and will succeed. Downing gooseberry and Barry grape doing well.

J. W. JOHNSTON.

Campbellford, Northumberland Co., Ont.

REPORT OF F. HORSA, FOR 1874, ON TREES RECEIVED FROM THE ASSOCIATION.

VINES.

Eumelan, fruit ripened end of September, but the crop inferior to last year.

Othello, bunches and berries large and showy, very acid, and did not ripen till second week in October.

Salem, made a good moderate growth. All my vines including Isabella and Sweetwater, though a full fortnight later than last year, ripened their fruits perfectly.

The vine flea-beetle did a little mischief. First frost affecting the vines was on the 22nd October, when the leaves were a little touched, but they were not cut down before 12th November when both those in the open air, and also in the cold vinery suffered.

PEARS.

Josephine de Malines, Beurre Clairgeau, made good growth, and are much improved.

All my pears have this year grown well. Only one, (Annas D'Eté, and the same tree was the only one last year), has shown any signs of fireblight. No pear slug. But of all, the Beurre D'Anjou, and Clapp's Favourite have made the finest and healthiest growth. Several varieties blossomed abundantly, but only one, (Duchess) set any fruit, and that ripened only two pears.

APPLE.

Grimes's Golden Pippin, has grown beautifully. Downing describes this as "having peculiar knobs at the base of each branch connecting it with the main limb." I cannot discover any signs of this peculiarity in mine, but in form and growth it looks suspiciously like Talman Sweet. Mammoth Cluster Raspberry thrives well enough, but is with me, in no way superior to the wild fruits. Wilson's Blackberry, no use whatever here, has been pulled down every winter. Downing's seedling gooseberry put forth two buds and died, was a miserable specimen when received. Last spring's frost was with me on the night of 6th May, but there were one or two very cold nights subsequently, though no actual frost.

Of the exotic grapes received from the Society, I this year had fruits from the following:—

Royal Muscadine,
Golden Hambro,
Dutch Hambro,
Frankenthal,
Lady Downe's Seedling,
Gros Colman.

The last cracked so badly that out of several bunches I scarcely got a single perfect berry, but the flavour was superb, as was also that of the Golden Hambro.

Black Monukka,
Gros Guillaume,
Black Prince,
Did not produce any fruit.

Glen Lawrence,
near Kingston, December 9th, 1874.

FRANCIS H. HORSA

REPORTS ON TREES AND PLANTS ISSUED BY THE ASSOCIATION.

Beurre D'Anjou pear is doing well this year, but others did not grow well, and the horses took great pains to bite it off several times; but will try and take better care in future. Wagener apple is doing well, has samples of fruit this year, Grimes G. Pippin never leaved out. Early Wilson B. Berry and Mammoth Cluster R. Berry have fruited two years, but having them in clay soil they have not done well. Clapps' pear is doing well, also the grape sent in 1873 in place of Eumelan which died.

I will now give you an insight into my orchard.

Apples—I have 200 choice winter and 50 summer and fall, all set 5 years; some have samples of fruit this year.

Plums—Have 50 trees set two years doing splendid, several of them fruited this summer, and most delicious fruit it is; I shall set about 150 more next spring, if all is right.

Peaches—Have 600 trees. Some fruit this year for first time on a few largest.

Pears—About 80 trees of choice sorts, but have not borne any yet, only set two years. I have no smaller fruits, but intend to set some next spring. I intend to devote myself to fruit culture as I am very fond of it. I have also this year about 300 grape vines, bearing this year for first time Concord and Delaware.

GEO. W. CLINE.

Winona, P.O., Box 35.

REPORT OF TREES FROM FRUIT-GROWERS ASSOCIATION, &c.

BY GEORGE PEACOCK, MOUNT SALEM.

Two Beurre d'Anjou pear trees growing slowly on our sandy soil.

Wilson's early blackberry had a slight crop this year, seems to me to be rather tender, but we shall give it further trial along with a few other sorts.

Othello ripened one bunch of grapes, vine quite luxuriant.

Clapp's Favourite Pear and Grime's Golden Apple are both growing and looking as well as one could desire.

Salem grape—dead—Downing's seedling gooseberry made poor growth this dry season.

Cherries, plums and peaches have been quite abundant in East Elgin this season, consequently prices have been low for inferior sorts.

Strawberries were a partial failure, on account of heavy frosts in the spring and want of protection.

The apple crop is light in this section; perhaps exposure to high winds during the time of blossoming thinned the fruit.

The apple-tree blight is pretty general through East Elgin; hope it may not prove a very serious disaster. Probably judicious pruning will remedy the evil; at least it seems to be useful where tried.

William Peacock's, Mount Salem, Clapp's favourite pear, and Grimes' golden apple are growing; Salem grape is living; Downing's seedling gooseberry is dead.

REPORT ON TREES ISSUED BY THE ASSOCIATION.

NORTH DOURO, Sept. 24th, 1874.

DEAR SIR,—I herewith send you report of trees as sent by Fruit-Growers' Association for trial.

1871.—Beurre D'Anjou pear made fair growth; blossomed; fruit not set; hardy. Early Wilson blackberry dead.

Mammoth Cluster Raspberry very hardy; fruit small—crop small.

1872.—McLaughlin plum died to graft. Hale's early peach died all the north-west side; killed altogether following winter.

1873.—Clapp's pear, hardy ; made fair growth ; did not blossom this season ; Grime's Golden apple died first winter.

1874.—Downing's gooseberry and Salem grape both died this spring.

W. W. NICHOLLS.

REPORT FROM AILSA CRAIG.

AILSA CRAIG, Sept. 10th, 1874.

Report for 1874 on trees distributed by the Fruit-Growers' Association :

Eumelan Grape.—The fruit buds were much injured by a severe frost about the middle of May ; the vine has to be laid down in the fall, or the wood will be much injured. The new shoots are more liable to be broken off by high winds than other sorts. I find it more prolific than the Concord. The Rogers (*Salem*) is doing well. The different varieties of pears are all doing well ; none have fruited. Grime's pippin—of about eighteen sent to my care for distribution, I only know of two that are living. The McLaughlin plum is doing well, and fruited this season. The Wilson blackberry requires covering up, to protect the new wood from our severe cold during winter.

The fine vines sent me in 1873 I placed in a vinery 18 by 12, made on M'Dougall's cheap plan. The mice destroyed a Royal Muscadine and injured three others ; three of them are doing well.

The Downing gooseberry is dead.

The apple crop will be short and fruit very small.

The Cherry crop was only a quarter crop.

The plum better than last season.

The plum curculio were very plentiful, and the apple curculio still more so, as shown by jarring the plum tree this spring. Query.—Do not the latter injure the plum crop as well as the former ; if not, how came there to be *two apple curculio to one plum curculio* on the plum trees during the spring of 1874 ?

G. G. HAMILTON.

REPORT ON FRUITS.

BY D. SHOFF, MCGILLIVRAY.

MCGILLIVRAY, Province of Ontario,
7th September, 1874.

I have some very good specimens I had intended to have brought with me. I have a seedling of the green gage, raised in this village by F. Jones, nearly the size of the Washington ; colour light purplish red, with a fine bloom. I am sorry that I was not able to show it to the members of the Board. All kinds of fruit are a failure here. Pears and grapes have done the best. The Logan is the earliest with me—a week a-head of the Clinton. My Delawares are ahead of the Concord ; in fact, they are the earliest except the Logan and Clinton, of some 13 kinds I have. My Eumelan is colouring nicely now, and nearly or quite as forward as the Delaware. Rogers No. 4 are colouring ; Nos. 33 and 15 have not commenced to colour. My Isabella slightly colouring. I lost two winters ago some 20 vines of Isabella some three inches in diameter, and some three vines of Catawba. I have lost no other vine from the effects of the hard winter two years ago. I may say my Delawares are well-shouldered, and large, compact bunches. They really are most beautiful. My vines are young, three and four years only. For this section the Logan, Clinton, Delaware and Eumelan are the safest varieties, as they will ripen well, and so will the Hartford Prolific. They are rather a shy bearer, and very open in their bunches, but firm and good in flavour. My Bartlett pears have done better this year ; well loaded.

D. S.

 REPORT OF TREES, VINES, Etc., Etc., 1873.

1870.—Eumelan Grapes, winter-killed to the ground, is doing well since.

1871.—Raspberry dead. Pears doing well.

1872.—Othello Grape, good growth; fruited well in 1872. Hale's Peach, nearly dead; doing well now.

1873.—Clapp's Pear, doing well. Brandy Wine, Grime's Golden Pippin, all dead but one.

I wish all trees or vines in future to be sent to me *direct*, and not to a party in Grimsby or anywhere else. Your last year's blunder in sending to Grimsby caused delay, disappointment, and much dissatisfaction with the Members here.

A. MORSE.

Smithville.

 REPORT ON FRUIT.

FROM O. F. KNISELEY.

I became a member of the Fruit Growers' Association in 1872, and received that year from Association the "Wagner" Apple and "McLaughlin" Plum. I planted them on a black mould with very heavy clay subsoil; I have not attempted to force by high manuring. They are both living and have made a fair moderate growth.

Last year I received the "Grime's Golden" and "Clapp's Favorite"—both still living, having made a fair growth. The pear was planted on a very heavy clay and the apple on a mellow soil with a porous limestone rock within about a foot from the surface.

Immediately after planting, I put about a half bushel of leached ashes around each tree which kept the roots moist, and also prevented grass from growing. I think this plan far better than stirring the ground, by which the roots are often disturbed, endangering the life of the tree.

O. F. KNISELEY.

Humberstone, Ont., March 23rd, 1874.

 PARK HEAD P. OFFICE CO. OF BRUCE,

AMABEL, 19th October, 1874.

DEAR SIR,—The following is my Annual Report on the trees and vines I received from the Association.

Eumelan Grape.—This is my Fifth Report of it. Last fall being rather mild, I thought I would risk it on the trellis; in the spring I found it frozen down to the ground, but it has made a very fine growth this season.

D'Anjou Pear, Fourth Report.—It has again made a good healthy growth with me, the wood ripening well.

Clapp's Favourite Pear—Second Report.—It grew well this season and seems quite healthy.

The Salem Grape and the Downing Seedling Gooseberry.—This is my First Report of them, they have done very well, not making a large growth, having all the appearance of being healthy.

I have no report to make on the trees sent in 1872, as they did not come to hand in proper time for planting, I feel quite convinced from what I see, that all those trees and vines, the Association distributed, will do well in this section of country, that is if they get any kind of fair play. I expect to see a large number of those farmers that take an interest in fruit-raising, joining the Association this incoming year throughout this section of country, as

they are beginning to see the great benefit it is to the country at large ; if the old members will do their duty and canvass their respective neighbourhoods, the membership will be far more than doubled. I think it would be a great help to us in the canvass if the report could be got out a little earlier than usual ; for my part, I will try to get all the names I can.

WM. SIMPSON,
Park Head P. O.

REPORT ON TREES RECEIVED FROM THE ASSOCIATION.

OTTAWA, 7th Dec., 1874.

With regard to the plants and trees received from the Fruit-Growers' Association, I beg to make the following report:—

I became a member in 1870, in which year I received Wilson's Early Blackberry and Mammoth Cluster Raspberry (Black Cap). I consider these two plants fully worth all the money invested in the Association. The former has been protected every year with earth, and so far has fruited well ; is a great ornament both in blossom and fruit ; when in flower in the spring it is as white all over as a snowdrift, and in fruit it is almost correspondingly black. The Kitatinny, receiving the same covering, has been rooted out as worthless, as it did not recover its vitality sufficiently in the spring to enable it to fruit. Young plants set out from the parent Wilson, fall of 1873, cut back to six inches, passed through the winter of 1873-4 without any protection, and made a good growth the past summer ; they have been left fully exposed this winter—that is trailing on the ground, but not tied to stakes—for the purpose of further testing their hardiness. Of the Kitatinny plant, treated in the same way, none lived through the winter of 1873-74. The Mammoth Cluster *stands any amount of cold*, and may be set down as perfectly hardy ; in this section cultivators will, however, find it to their advantage to replant every four years, as the old stools will not yield profitably for more than three years running ; young plants should, of course, be obtained from the tips of canes laid down in August or September.

The McLaughlin Plum and Seckle Pear sent out in 1871, were both frozen down to the snow line the winter after they were received ; the plum shot up above the graft bud, and is now making a good tree, height five feet. Seckle sprouted again, but not very strong ; have trained it as an Espalier in order to keep the branches below deep snow in winter. Two Wagners were received in 1872 and Arnold's Othello Grape. One Wagner was frozen down, the other bore three apples the past summer ; the one frozen down has sprouted again and is doing well. Arnold's Grape is a very thrifty, rapid grower ; it has a strong tendency to overbear, had to cut more than two-thirds the bunches off after the fruit was set, and then it was too heavily loaded this season ; it ripens early, but is evidently a frost grape, as the flavour was not good. After ripening, and before the frost came, I regret to say the children and chickens took all the berries. I have always given this grape, as others, winter protection with soil. In 1873 received Grime's Golden Pippin, and Clapp's Favourite Pear. The apple was frozen down, but is starting again, the pear stood last winter well, and is one of the finest trees in the garden, having made a splendid growth. For 1874 received Downing Gooseberry and Barry Grape (Rogers 43), the former just alive ; grape did well, and has received winter protection. The Lady Downe's Grape received for trial under glass has made a splendid growth, and I hope to report a bunch or two next year. From the above it will be seen there have been more blanks than prizes, but my motto is "if you fail, why, try again." Have thoroughly underdrained garden this fall, and expect best results.

P. E. BUCKE.

REPORT ON FRUITS.

PORT COLBORNE.

November 30th, 1874.

DEAR SIR,—Agreeably to request, I send you a slight sketch of my experience and observations in the garden this year.

This has been a very severe season on fruit and fruit-trees in this locality. My own garden, however, has been an exception, for I had a finer sample than usual. I applied 350 bus. of leached ashes per acre to my fruit land and planted it with corn and potatoes—probably the ashes had a beneficial effect in producing the results mentioned above. My Salem grape acquired over two feet of vine; but the McLaughlin plum grows slowly. The quality of the fruit, however, is excellent. It ripened three fine plums—sweet, juicy, and of delicious flavour.

The Wagner apple had a few blossoms. The “Clairgeau” pear, and Clapp’s Favorite grew well.

The plum curculio was not so destructive this season as heretofore. It lasted but a few days.

Potatoes suffered from the voracious Colorado bug. The crop was injured very much. We also had a visit from a stranger, the Rape butterfly, and I can assure you he was not a welcome guest, for his ravages in the cabbage garden were so extensive as to totally destroy the crop. I was pleased to observe that he has an enemy which will prevent his rapid increase.

I gathered seven chrysalides, only one of which was uninjured. On opening the cocoons I found about forty small white maggots, perceptible only by the aid of a microscope.

I have the finest lot of prune grafts I ever saw.

I cut my scions in the month of February, and as soon as the frost was out of the wood in the month of March, I set the grafts on the frost gage, and not one failed. They obtained a very excellent growth, having made from ten to twenty feet of wood.

JONAS NEFF.

OWEN SOUND FRUIT.

Mr. Roy, of Royston Park, Owen Sound, has sent a fine assortment of fruit to the President of the Fruit-Growers’ Association of Ontario. There are five varieties, viz.: apples, pears, plums, peaches and grapes. Of the apples, the Rhode Island Greening and Baldwin are superb specimens. Mr. Snider, M.P., shows a very fine sample of Cayuga Redstreak; nor are the other varieties to be despised. The Gravenstein, Yellow Belleflower, Spitzenburg, Ribston Pippin, Fall Pippin and Roxburgh Russet, will compare favourably with the same-sorts raised in our own favoured region. A very remarkable seedling is not the least attractive in the lot. Its shape is perfect, coloring good, and its keeping qualities scarcely to be excelled; for it is a long keeper, good even in August next. The specimens of Flemish Beauty, Beurre Diel, and Clairgeau are not to be excelled anywhere. We question if finer samples were shown at the Provincial exhibition. These three varieties are really magnificent. We will not despair of the Owen Sound district when such fruit can be there raised. The Sheldon and Beurre Easter were fair fruit. Fine samples of a prune called the Fellenburg are also enclosed. We mistake much if this plum will not be extensively cultivated for drying purposes. It is a freestone, large, handsome, and admirably adapted for cooking. Of grapes, we have the following sorts: Creveling, Isabella, Rogers’ Nos. 3, 4, and 15, Concord, Delaware, and a seedling. We question if the samples of Creveling and Concord are really Creveling and Concord. The Creveling sent has none of the characteristics of that fruit. Whatever they are, however, the bunches are splendid. The Rogers’ varieties are something wonderful, both in point of size and berry, and size of bunch. The Delaware is beyond medium, and the seedling, from the beauty of the berry and size of bunch, is well worthy of cultivation. Early Crawford peaches close the lot. They are undistinguishable from the peaches grown here, equally good, and nearly as large. We may add that the Fellenburg was not perceptibly the worse of the carriage; the peaches carried well, and Coe’s Golden Drop plum, of which there was quite a quantity, were just in the condition in which

they had been gathered. We augur that the Owen Sound district will be heard of for its fruit-growing capabilities. All honour is certainly due the pioneers of this section for their efforts in fruit-growing.

SEEDLING GOOSEBERRY.

I have sent you a sample of Stokes' gooseberry. The seed I received direct from England, they are not fully ripe, but I had to take them to prevent the birds from taking them, as I had other excellent seedlings destroyed by them. I began to raise gooseberries in the town of Sarnia, in the year 1839, and have raised them every year since without any trouble.

WILLIAM STOKES.

Mooretown, Ont., July 24th, 1874.

The white seedling gooseberry raised by Mr. Wm. Stokes, Mooretown, is, in my opinion, a decided acquisition, and approaches the strain of the Lancashire or Scottish varieties more closely than I have ever seen in Canada. Indeed, I would in short pronounce it to be a grand-child of my favorite, the old White Smith.

PETER MURRAY.

Athol Bank, Hamilton, 28th July, 1874.

METEOROLOGICAL.

OWEN SOUND, July 21st, 1874.

REVD. ROBERT BURNET.

DEAR SIR,—In order to give you an idea of the temperature of our climate by comparing it with your own, I send you the following, if it be of any interest. It is taken from a mercury registering thermometer for both cold and heat, but only kept the higher temperature for about a month, so I only send the lowest :—

November 14th, 1873.

Nov.	14	above	7	Dec.	20	above	24	Jan.	15	above	* 1
"	15	"	24	"	21	"	15	"	16	"	* 0
"	26	"	10	"	22	"	20	"	17	"	10
"	27	"	12	"	23	"	20	"	18	"	20
"	28	"	2	"	24	"	30	"	19	"	30
"	29	"	18	"	25	"	29	"	20	"	* 2
"	30	"	14	"	26	"	29	"	21	"	11
Dec.	1	"	14	"	27	"	28	"	22	"	36
"	2	"	14	"	28	"	18	"	23	"	28
"	3	"	42	"	29	"	1	"	24	"	21
"	4	"	32	"	30	"	22	"	25	"	8
"	5	"	20	"	31	"	misses	"	26	"	2
"	6	"	20	Jan.	1	"	22	"	27	"	21
"	7	"	16	"	2	"	32	"	28	"	20
"	8	"	22	"	3	"	36	"	29	"	16
"	9	"	36	"	4	"	51	"	30	"	* 2
"	10	"	31	"	5	"	22	"	31	"	2
"	11	"	30	"	6	"	16	Feb.	1	"	3
"	12	"	32	"	7	"	23	"	2	"	2
"	13	"	20	"	8	"	28	"	3	"	14
"	14	"	21	"	9	"	25	"	4	"	7
"	15	"	28	"	10	"	28	"	5	"	* 8
"	16	"	misses	"	11	"	22	"	6	"	12
"	17	"	32	"	12	"	16	"	7	"	10
"	18	"	34	"	13	"	13	"	8	"	3
"	19	"	33	"	14	"	14	"	9	"	18

Feb.	10	above	16	March	9	above	12	April	5	above	10
"	11	"	12	"	10	"	12	"	6	"	24
"	12	"	2	"	11	"	12	"	7	"	29
"	13	"	41	"	12	"	5	"	8	"	23
"	14	"	20	"	13	"	3	"	9	"	22
"	15	"	25	"	14	"	12	"	10	"	19
"	16	"	26	"	15	"	10	"	11	"	18
"	17	"	14	"	16	"	20	"	12	"	8
"	18	"	1	"	17	"	32	"	13	"	20
"	19	"	15	"	18	"	42	"	14	"	46
"	20	"	16	"	19	"	36	"	15	"	40
"	21	"	20	"	20	"	24	"	16	"	22
"	22	"	20	"	21	"	32	"	17	"	26
"	23	"	28	"	22	"	24	"	18	"	25
"	24	"	8	"	23	"	8	"	19	"	28
"	25	"	10	"	24	"	6	"	20	"	32
"	26	"	* 5	"	25	"	22	"	21	"	missed
"	27	"	21	"	26	"	32	"	22	"	28
"	28	"	12	"	27	"	13	"	23	"	24
March	1	"	22	"	28	"	12	"	24	"	18
"	2	"	34	"	29	"	12	"	25	"	19
"	3	"	40	"	30	"	18	"	26	"	34
"	4	"	15	"	31	"	8	"	27	"	24
"	5	"	13	April	1	"	* 0	"	28	"	24
"	6	"	22	"	2	"	24	"	29	"	22
"	7	"	30	"	3	"	14	"	30	"	26
"	8	"	26	"	4	"	* 0				

Comparisons noted :—

Boston, January 26 above + 0
 Lancaster, " " + 38
 Concord, N.H. " " + 10
 Halifax, " " + 10
 Montreal, " " + 18
 Ottawa, " " + 30
 Toronto, January 30 " + 2
 Yorkville, " " + 3

Montreal, " " + 12
 Ottawa, " " + 14
 Brockville, Feb. 2 " + 14
 Ottawa, " " + 22 & 34
 Halifax, " " + 10
 Kingston, " " + 16
 Boston, " " + 0
 Lewiston, Maine, " " + 31

* All below zero is marked.

† The places above named were taken from newspaper telegraph reports of cold spells.

I am, dear sir,

Your truly,

JOHN McLEAN.

REPORT ON J. W. JOHNSTON'S SEEDLING GOOSEBERRY.

ATHOL BANK, 8th August, 1874.

REV. R. BURNET.

MY DEAR SIR,—The Seedling Gooseberry you have sent to me, I have just tasted. My opinion in regard to it is, I am sorry to state, *poor*, having little flavour, as far as my taste goes.

My dear sir,

Yours truly,

P. MURRAY,

REPORT ON DAVID BRADT'S SEEDLING APPLE, NORTH GLANFORD.

HAMILTON, 12th Nov., 1874.

Russet, medium size, "VERY GOOD" flavour, flesh-breaking, worthy of propagation.

ROBERT BURNET, *Chairman*.
D. W. BEADLE.

REPORT ON CHARLES ARNOLD'S APPLE, No. 5.

14th September, 1874.

My opinion of the merits of the apple you have just sent for my judgment is as follows, viz., That it is of *plain medium* flavour, hardly up to the mark as to become a standard of excellence. It, however, may if a prolific bearer, be useful and profitable for Fall use.

I am, my dear sir,

Yours truly,
PETER MURRAY.

REPORT ON MR. COWHERD'S APPLES.

NEWPORT, ONT., Jan. 24th, 1874.

REV. R. BURNET.

DEAR SIR,—I left at the Express Office, a basket of apples addressed to you. I hope you have received them.

They are seedlings of my own raising.

No. 2 & 3 are 24 years old.

No. 2 & 3 are from the seeds of one Esopus Spitzenburg apple.

No. 2 is a fine hardy tree, growth similar to its parent; it has been in bearing 14 years. Bears more or less every year.

No. 3, growth upright and spreading, been in bearing about 15 years.

No. 32, a seedling from snow apple, growth strong, thin and spreading—been in bearing four years.

No. 2 & 32 are over ripe.

I remain, yours truly,

JAMES COWHERD.

These varieties do not equal similar varieties ripening at the same season already in cultivation.

ROBERT BURNET,
PETER MURRAY.

REPORT ON MR. CANNON'S SEEDLING APPLES.

These two apples are fair in flavour, good size; the Rhymer showy, and very firm.

1st—Is pale yellow, and named Coe's Golden Drop.

2nd—Rhymer, a large deep, dark-coloured, close-grained apple, and raised and cultivated in the neighbourhood of Owen Sound. They are not superior to the varieties ripening at the same season.

ROBERT BURNET,
PETER MURRAY.

REPORT ON WILLIAM HOLMES' SEEDLING APPLES.

HAMILTON, 10th Oct., 1874.

These apples reached us in October. There were three different sorts, one a flat, green apple, another a Russet, a long keeper, but not of superior flavour, and the third, a pale yellow apple, of no great merit.

PETER MURRAY,
ROBERT BURNET.

REPORT ON S. H. WILLIAMS' SEEDLING GRAPE.

A grape of great excellence, bunch large and shouldered, good flavour, said to be hardy, well worthy of cultivation.

ROBERT BURNET,
PETER MURRAY.

REPORT ON SEEDLING APPLES FROM TWEED,

FORWARDED BY JOHN GORDON.

Large, handsome, showy fruit—not better than cultivated sorts of their season.

R. BURNET,
PETER MURRAY.

REPORT ON SEEDLING APPLE,

SENT TO COMMITTEE BY GEORGE PEACOCK, MOUNT SALEM.

The fruit fair, handsome. Mr. Peacock says, "it is good for any purpose for which sweet apples are used, particularly for cider sauce. For baking, these apples excel all others with which we are acquainted, the juice from them when baked or boiled, being almost equal to maple molasses. The tree is at present owned by Mr. Samuel Tedford, of Gravesend, Malahide, Elgin, one mile from Lake Erie."

REPORT ON SEEDLING GRAPES,

RAISED BY W. H. MILLS, HAMILTON.

I received an invitation from you asking me to attend a meeting of Fruit-Growers' to be held at Wm. H. Mills, Esq., to examine and test some new seedling grapes of his own raising. Our opinion given must be considered in the light of an introductory or preparatory report which we shall look forward to with a very great deal of interest, to be drawn by the most competent Grape-Growers' and Wine-Makers both of Canada and the United States next year, and which, I understand, it is the intention of Mr. Mills to carry out, by bringing his seedlings before the Fruit-Growers' Associations both of Canada and the United States for their opinions. This year, we consider, is not a fair test of its merits, as the fruit was borne on very slender wood, compared with the growth they have made and perfected this year.

The Red Grape is a most excellent variety, and one we think will rank very much higher than any other hardy variety of that color and season, ripening very early and thoroughly; it will, no doubt, be the most popular variety in existence with the amateurs and Wine Makers. Fruit this year of good medium size, both in berry and bunch, and in our opinion very much superior to the Delaware with which it was tested, with the best specimens that could

be procured. The vine this year has made an excellent growth of firm wood, just such wood as grape growers' like to call to the attention of their friends. The main shoot this year is 12 feet long, 9 feet of which is thoroughly ripened, 3 feet of which contains 10 eyes and joints, and we look forward and expect the fruit next year will be very much superior to this one both in size of bunch and berry.

We also examined and tested a white variety of a most excellent quality, containing a very high muscat flavour, and in our opinion it only wants a favourable year to bring its merits fully before the public. To say its quality is equal to the muscats grown under glass is as near as we can describe its merits. Bunch and berry of good size, with as much muscat flavour as any grown under glass and well ripened, 1st Oct.

The vine has made a growth this year of the main cane 10 feet long, with side canes 6 and 7 feet, and has ripened its wood thoroughly, 7 feet in length, 3 feet of which contains 13 joints or eyes, and is in the very best position to bear a good crop.

Both those varieties mentioned are seedling hybrids; stood last year without any protection, being grown in mixed variety of fruit trees of several acres in extent, and it is the intention of Mr. Mills this year to leave the canes unprotected, so as to thoroughly test their hardiness.

Mr. Mills has also other seedlings, some of which have considerable merits, particularly a black variety which he purposes to bring before the public next year.

All of which is most respectfully submitted.

JOHN FREED,
RICHARD ROWE.

REPORT OF COMMITTEE ON C. BIGGAR'S SEEDLING STRAWBERRY.

The President having received a requisition from Mr. Biggar to name a committee to examine his seedling strawberry, as growing on his grounds at Drummondville, nominated Messrs. Beadle, A. M. Smith, and Burnet for this purpose. The Committee beg leave to Report to the Directors of the Fruit-Growers' Association of Ontario, that they made a careful examination of this fruit. They found it growing luxuriantly, and fruiting well. It is large, handsome, bright red, softish, well-flavoured, with a rich aromatic taste. In comparing it with the Wilson's Albany, growing alongside, it appeared to be scarcely so abundant a bearer as the Wilson. The committee thought it a berry of good promise. A fortnight after the examination, Mr. Smith forwarded a quart of Biggar's Seedling to the President, to show how long and well it kept. He (Mr. Smith) says it hangs on wonderfully well.

D. W. BEADLE,
ROBERT BURNET,
A. M. SMITH.

REPORT ON PLANTS RECEIVED FROM THE ASSOCIATION,

BY SAMUEL HUNTER, SCOTLAND, BRANT.

Clapp's Favourite and Grimes' Golden, received two years ago, are alive, and made a fair growth last season.

The Gooseberry and Grape vine received in the Fall of 1873, are alive, but make very little growth. In order to destroy the worm of the codlin moth, I tried strips of cloth around the trees, and examined them once a week, and never found less than half-a-dozen in every cloth. On one occasion I found fifty-two worms, concealed in the cloth, on a Northern Spy.

REPORT ON PLANTS RECEIVED FROM THE ASSOCIATION.

BY JOHN MORRISON.

MOORE, ONT., 23rd Dec., 1874.

DEAR SIR,—The Salem Grapes and Downing Gooseberries were received by me, for members of the Association, in good shape, and all promptly delivered, and were generally satis-

factory; four of each fell to my share, and were all planted under the same circumstances. The ground is a clay sub-soil, and it had been lying in commons for 20 years till purchased by me last spring; the ground is somewhat stiff, I gave it a good coating of manure, and planted grapes as careful as my limited knowledge allowed me. Three of them made a fair growth, the canes being quite strong, but not exceeding in length 3 feet. The Gooseberries did not do well, two died soon after planting; two survived, one of which made a fair growth, but the leaves got very pale, seeming not at all healthy, and about August, a young man working round the premises finished it by tramping it right down, and the *poor thing never recovered*. The fourth is alive, but whether it will survive the winter remains a mystery. I got a few 1 year old Concord Grapes which I planted in same piece of ground with Salem and they did remarkably well, the roots were produced from layered branches of the previous season, and were very excellent.

The green-house grapes which your Society liberally bestowed to members on application, had no chance with me the past season. I received them in Spring in good condition, and was highly pleased with them, and had I got them planted at once in the place allotted for them I have no doubt they would have made an immense growth; I planted them in 10 inch pots, and they started beautifully, my new premises got along slower than I anticipated, and the grapes were growing so fast in the pots, that I was afraid they would get pot-bound and I set them out and under the shade of a tree, where they got very limited watering, and where they stood till middle of August, when I finally got them into their natural element, but the check hurt them and they made no more growth. They are all alive but two.

REPORT ON PLANTS RECEIVED FROM THE ASSOCIATION.

BY DOCTOR S. B. SMALE.

WROXETER, Dec. 18th, 1874.

I received the Salem Grape and Downing Gooseberry which were distributed by the Fruit-Growers Association of Ontario, last Spring. The plants came to hand in good order by mail sometime in the last week of April. I immediately planted them, the buds of the gooseberry having already commenced to open. The weather at the time was very cold with bright sunshine during the day and hard frost every night, which continued to the end of the first week of May. The grape commenced to leaf about the end of May: from three or four buds, I selected the most vigorous, pinching off the others. The one allowed to remain developed itself into a stem of thirteen nodes by the beginning of October, when its growth was checked by frost. It is now lying on the ground covered with a layer of straw for protection.

The gooseberry bush continued in leaf all season, but made very little growth.

I did not mulch, but kept the earth frequently stirred with a hoe about the roots.

The lot is an elevated piece of ground gently sloping in all directions. The Eastern incline is the one I have selected for the orchard and garden. The vegetable soil is a mixture of the clay and calcareous moulds with the calcareous predominating, ranging from a foot to two and half feet in thickness. The subsoil underlying this is gravel. The lot has not yet been drained. There was a cellar excavated on it in the Spring of 1872, and the cellar has been at all times dry since that time. It may not be uninteresting in this connection to say a few words about fruit culture in this section of Ontario, viz., the North-eastern part of the County of Huron. It is inland, being about 30 or 35 miles east of Lake Huron.

Apple orchards have been cultivated more or less for the last sixteen or eighteen years, and are now bearing largely in favourable seasons. This year the crop was a pretty general failure, in 1873 the crop was very large. The summer frost is very destructive to fruit cultivation in this neighbourhood, scarcely a season passing without some damage being done. A great part of the crop is deteriorated by the ravages of the codlin worm, and no measures have as yet been put in force to lessen its destruction of the fruit. The purchasers of trees in this locality were sadly victimized in its early history, by unprincipled nursery agents, most of the trees sold at that time proved on fruiting to be Talman Sweetings. The varieties most generally grown are the Red Astracan, Early Harvest, Northern Spy, Spitzenburg, Golden Russet, Colvert, Talman Sweeting—Seek No Further, R. J. Greening, and Fameuse.

The plum is grown to perfection; some of the best specimens I have ever seen being produced in the Townships of Howick and Turnberry. The black knot is a thing hitherto almost unknown. I have only seen it in one or two instances during the nine years I have resided here. The curculio has not yet seriously injured the plum in this part of the county. The kinds cultivated are the Imperial Gage, Green Gage, Lombard, Yellow Egg, Duanes Purple, and Common Blue.

The pear tree grows well, and does not seem to be injured by the frost. It is receiving more attention every year. The hardier varieties can be profitably cultivated. The only kinds I have seen fruited are the Flemish Beauty and Bartlett which were very fine, and sold readily for \$2, \$2.50 per bushel. Several other varieties are being tested, but have not yet come into bearing. The "blight" has not made its appearance in a single instance that I am aware of.

The cherry is not much cultivated, but I know of no reason why the cherry may not be successfully grown.

Peaches not grown.

Berries almost entirely neglected.

Strawberries are grown in great abundance, ordinary care and attention being rewarded by a very large yield. Kinds, Triomphe de Gand and Wilson.

Gooseberries are well grown, the Houghton Seedling being the kind cultivated in almost all cases. The Downing Gooseberry is perhaps more frequently ordered now than any other.

Currants are for the most part a success, the only exception being in the case of the White Grape, which is nearly destroyed by a worm boring in the stem, constantly tunnelling in every direction, and it is the most persistent and indefatigable little villain that I know anything about; nothing will satisfy him, but the complete extermination of the White Grape Currant. Most gardeners have ceased to cultivate it. The Cherry Red does well, and the Black Naples grows, and bears most luxuriantly.

Grapes are cultivated with partial success, some years a very good crop being obtained. The grape vine Sphinx (*Chærocampa pampinatrix*) is known here, but has not seriously interfered with the prosperity of the cultivator of the grape.

The varieties grown are the Clinton, Concord, Delaware, Hartford Prolific, and Isabella.

REPORT ON PLANTS RECEIVED FROM THE ASSOCIATION.

BY DAVID LUTZ, ESQ.

ST. CATHARINES, 11th Oct., 1874.

The Beurre d'Anjou and Clapp's Favourite pear trees are growing first rate—Grime's Golden Pippin dead—Wagener Apple growing well. The Eumelan Grape has borne some very fine fruit; some bunches weighed six ounces; Othello has some fruit sweet; Salem grew some two feet; Downing Gooseberry grew well.

Mammoth Cluster Raspberry has done well, fine fruit—has propagated one hundred plants from it. Early Wilson Blackberry yields splendid fruit, which lasts a long time.

FRUIT REPORTS FROM NOVA SCOTIA.

COLLECTED BY CHARLES E. BROWN, ESQ., YARMOUTH.

Mr. Brown has made himself most active in preparing these reports, and furnishes pomologists throughout Canada with important information, not otherwise obtainable.

TO D. W. BEADLE,

Sec.-Treasurer Ontario Fruit Growers' Association.

For a Yarmouth man to undertake a report on the Pomology of the Province, may seem as absurd and incongruous as for a Manitoban to embark in a history of the Commerce and Shipping of the Dominion, or for the lighthouse keeper on St. Paul's, to discourse upon its agriculture and its flocks and herds.

It must be my apology that, having experienced the great disadvantages—years of time lost and money uselessly expended—incurd simply and solely from having no references or authority on varieties of fruit, and being anxious that the results of several years careful observation and experiments should not share the fate of all past experience in the County, of which scarcely a trace or tradition remains, I conceived that if a circular were placed in the hands of the most competent Fruit Grower in each County, to fill out and report, each for his own section of the Province, the whole when compiled, would form a reliable authority for each County and for the Province at large. The Secretary of the Central Board of Agriculture, Prof. Lawson, kindly offered to address the circulars to such men as his correspondence with the various Agricultural Societies of the Province should recommend.

I proposed for myself to report for Yarmouth County only, probably by natural condition least adapted of all our Counties to fruit-growing; and possibly, if the reports were in such shape as to admit of it, to bring the whole into tabular form for facilities of reference, and to entail as little labour as possible upon you who had kindly offered to include in your next volume, whatever reports we might send from this Province.

The circulars were distributed about September 1st, enclosed with stamped envelopes, addressed for remailing, and with the request that they be remitted September 20th, were addressed by Prof. Lawson as below:—

Annapolis Co	.....	Charles B. Whitman	.....	Bridgetown.
"	.....	Avard Longley	.....	Paradise.
Antigonishe	"	D. Chisholm	.....	St. Andrews.
Cape Breton Co	.....	Henry Davenport	.....	Sydney.
Colchester	"	Israel Longworth	.....	Truro, handed by him to J. B. Calkin, Prin. of Nor. School.
Cumberland	"	T. D. Dickson	.....	Parrsborough.
"	"	Hiram Black	.....	Amherst.
Digby	"	John Dakin	.....	Digby.
"	"	Colin Campbell	.....	Weymouth.
Guysboro	"	John A. Kirk	.....	St. Mary's River, Cross Roads.
Halifax	"	G. A. S. Crichton	.....	Dartmouth.
Hants	"	Prof. Hyna	.....	Windso.
"	"	Rev. F. Smallwood	.....	"
"	"	William Ferguson	.....	Noel.
Inverness	"	John A. Ross	.....	N. E. Margaree.
King's	"	Dr. C. C. Hamilton	.....	Port Williams.
"	"	R. W. Starr	.....	"
"	"	Geo. E. Lydiard	.....	Berwick.
"	"	Jonathan Rand	.....	Cornwallis.
Lunenburg	"	B. Zwickel	.....	Mahone Bay.
Pictou	"	Daniel Matheson	.....	Pictou.
Queen's	"	J. M. Freeman	.....	Pleasant River.
"	"	Dr. H. G. Faush	.....	Liverpool.
Richmond	"	M. McRae	.....	St. Peter's.
Shelburne	"	Rev. M. G. Henry	.....	Clyde River.
Victoria	"	John McLennan	.....	Middle River of Vic- toria, Cape Breton.
Yarmouth	"	Charles E. Brown	.....	Yarmouth.

In 1867, having, with a club of friends, under the name of "the Carlton Club," bought a property at Carlton, in the north-eastern part of this county, about fifteen miles from town, partly with a view of trying what could be done here in fruit-growing, and wishing to set out some young trees at once, it became of the first importance to know what kinds to plant. No publication on fruit growing having been issued, a correspondence was entered upon with some few gentlemen who were then known only by reputation as fruit-growers, and a couple hundred trees were bought in Cornwallis and set out, at the same time some of the old trees upon the place were grafted with scions got from the United States. Planting and grafting have

been continued every season since. As an indication of success, I may say that the Carlton Club have taken first prizes in 1873 and in 1874 for best collection of apples at the Annual County Agricultural Exhibition. Of strawberries from one half-acre of Wilson's Albany, there was sold, in 1874, \$133 worth, besides all consumed upon the place, for home use and by visitors at Pic-nics, &c., &c. It is evident that many of the kinds that are popular in Cornwallis will not succeed here, and that we must experiment for ourselves. It was gratifying to be rewarded in a very few years with fine fruit from some of the newly grafted trees. Of these, Red Astrachan does best; vigorous in growth, an early annual, and abundant bearer, while the fruit attains a fair size, high colour and quality. In some, near the coast, this variety is useless, the fruit failing to grow to maturity and to colour. So Grime's Golden Pippin on the coast does not much exceed a nutmeg in size, but at Carlton considerably exceeds the Golden Pippin of Cornwallis, and promises to be valuable. The trees make a very beautiful round top, the wood hard and as tough as walnut. The Gravenstein succeeds tolerably well both inland and on the shore, although much inferior in quality to the Gravenstein of a warmer region. Many varieties will do well inland that are worthless upon the shore; the reverse will not, however, hold, but any variety that succeeds moderately well upon the coast will do much better inland. Duchess of Oldenburg, Gravenstein, Green Sweet, Hubbardston Nonsuch, Keswick Codlin, Primate and Wagener, with all varieties of crabs, are all that can, so far, be recommended for the coast lines and the cold section of the Province, but all of these may be tried with confidence.

The tabular statement and report for Yarmouth County, will indicate what varieties may be tried inland, and in the more favourable sections.

The conditions that militate against fruit upon the coast—a low average summer temperature, absence of sunshine and abundant moisture from fogs—are so favourable to tree growth that one of our greatest difficulties is to check the superabundance of wood, and we have no trouble in growing trees from root grafts.

In 1869, I got 2,000 apple root grafts, of twenty varieties, from F. K. Phoenix, of Bloomington, Illinois—not one per cent. failed to do well. The Keswick Codlin bore fruit in 1872, and other varieties are coming into a bearing state now. With express and other charges, these root grafts cost us one cent each, and were offered to the members of our County Agricultural Society at that price; the greater part, however, had to be sold to a nursery, and were sold this spring, at \$1.50 each, for small orchards and gardens about here.

A second importation of 10,000, from the same source, was followed with great success in growth and promise; these trees are mostly yet in the nursery.

Every county in the Dominion should be equal to the supporting at least one small nursery, stocked with such kinds as succeed best there; started with root grafts, which will cost, in quantities, less than one cent each. Trees can be grown ready for sale, and worth 25 to 50 cents in two years, and to any one having a liking for horticulture the business would be a profitable one. Having grown root grafts, and grafting myself every season, using two or three year old stock, I see no choice whatever for the one mode over the other in growing trees; judicious care and cultivation will insure good trees either way.

A great deal of trouble arises from the carelessness of beginners about names. As the labels sent out from nurseries are among the most perishable of earthly things, too much care cannot be exercised in replacing these with permanent labels, and in recording the name and location of every tree planted.

Slips of glass written on with quartz or a diamond would make excellent labels, if holes for the wire could be easily drilled, and the method of doing it made known, so that any one might manufacture his own labels.

One of the greatest triumphs I have now in pomology is in identifying varieties, and having distributed many thousands of scions throughout the county within the last ten years, among growers who are so careless that probably not one in ten keeps the name till he gets home, the exercise of skill in identification is often called for; moreover, nothing has surprised me more than the difficulty in identifying varieties. Among the trees in my garden is one that makes a fine vigorous growth, with a wide bushy top, and bearing an apple above medium size, ripening upon the tree in October, and best in quality; tree planted in 1866, a dwarf got from Hovey & Co., Boston. The fruit was sent to our Fruit-Growers' Association in 1872, and to our Pomological Society in 1873, but by neither body, or committee of experts, could a name be assigned to it. Only two days ago I ascertained that it was

Primate, and recommend that variety as likely to succeed in the very coldest place in this Province. The Gravenstein has been growing right under my nose for years, and the fruit had been also sent away for identification without success, before we made it out by specimens grown inland, from some of the trees on the shore. The variation under changes of soil and climate are thus puzzling, even to the most skilful pomologists.

A great change has taken place in the climatic conditions of the County and of the Province within the last thirty to fifty years, consequent upon the clearing of the forests, which has removed from large sections of the country the shelter once afforded by them. The lowering of the temperature thereby is probably not less than equivalent to 10° or 15° . Old apple trees planted by the early settlers are still standing of dimensions not attainable now; I have just measured one in the adjoining school section, the trunk measures seven feet four inches in circumference; the tree is thirty feet high, and the branches have a spread of forty-five feet. These old trees seem to be all seedlings, the fruit but one remove from crabs, although it is possible that cultivation would prove that they were the degenerate, because neglected, offspring of respectable ancestors.

Here, as elsewhere, fruit growing seemed too distant and uncertain a support; and immediate demands for the family wants, made other pursuits imperative—upon the coast, the fisheries, and inland—lumbering, ship lumber, cordwood, &c., &c. So, instead of fruitful orchards, we have our ships upon the main, and in these we show a larger average per head of population than any part in the Dominion or elsewhere.

Of late years, with improved circumstances, more attention has been given to fruit-growing, and the partial success that has attended recent experiments, will stimulate to further efforts.

In small fruits of all kinds we can grow most varieties to perfection. The strawberry, although late, attains a large size, and under good cultivation yields large crops, giving more profit to the area planted than any other fruit. Wilson's Albany and Jucunda are by far the two best for productiveness.

A few points will illustrate peculiarities of climate. The proportion of overcast or windy days in summer is so great that the keeping of bees is impracticable, so far as surplus honey goes. They store up enough for their own support, and every second swarm will survive the winter out of doors, but I have never had a swarm yet which would lay by any honey for me. A strong hive usually sends off two swarms every season, but the keeping of them, unless one resorts to killing the surplus, only involves trouble and expense, without use or profit.

Upon the coast tomatoes fail to ripen in the open air—inland succeed tolerably. Onions are rarely grown from seed. The potato or multiplying onion is chiefly grown, and for early use sets are imported from the United States and do well, but will not keep through the winter.

Our winter climate is extremely variable, fluctuating with every change of wind; a thaw always follows a south wind, and snow seldom remains for more than a day or two upon the ground: within a few hours we frequently have changes of forty degrees, and in mid-winter, not rarely snow, ice and frost vanish entirely, and with a sunny south wind, we have the temperature of April or May.

Such sudden changes are extremely trying to plant life, the frequent freezing and thawing sometimes lifts them entirely out of the ground—to prevent this, and to keep the plants green and moist, a winter covering of straw, seaweed, or evergreen bush is imperative. I find the last most convenient, being easily procured, applied or removed with less labour than any other material, while in efficiency for the object sought, I have not observed any difference.

Several varieties of apples either supposed or known to be seedlings are popular in the County, and one or two are worthy of cultivation. The Andrew's Sweet or Major Sweet is a very pleasant sweet apple of medium size, yellow, with a blush; fair, round, conical, ripening in October, and will keep sound until February. The Reynan, a large, round, yellow apple, is our most showy apple for size and beauty, sub-acid, and of fair quality, keeps until February—in a warmer climate might prove much better in quality. I have sent scions of these two varieties, to Phoenix, of Illinois, to Ellwanger and Barry, of Rochester, and I think to D. W. Beadle, or to Charles Arnold. Mr. Arnold's seedling strawberry is doing splendidly. I have no variety that has made a more vigorous growth this season, except that it seems a little reluctant to throw out runners. The fruit will be looked for with impatience, and if it

sustains its home character, I shall consider the acquisition of this one variety of the straw berry an ample recompense for the little I may be able to do in behalf of the Ontario Fruit-Growers' Association.

CHARLES E. BROWN.

Yarmouth, N.S., 25th Sept., 1874.

26th October, 1874.

Having had the privilege of acting as one of the judges on fruit, at the last Provincial Exhibition at Halifax, October 5th to 10th, I had every facility for examination and comparison.

The chief collection which took the first prize, \$50, sent by the Fruit-Growers' Association, mostly from King's County, numbered over 200 varieties of apples alone, and demonstrated beyond a question that many varieties can be grown in King's County to perfection; smaller collections from Hants County, and from Amherst County, were nearly equally good in quality, while the few specimens sent from Colchester, Pictou, and Queen's gave sufficient evidence that even in these counties fruit-growers have only to plant the best varieties to ensure success.

A single plate, well-grown and colored, of a tender variety from any county, may be accepted as a test, and implies not only that other tender kinds may do well, but that all the hardier varieties can certainly be grown. So any of the kinds which are rated as promising in Yarmouth County, may be planted with confidence in Colchester, Pictou and Queen's. It was unfortunate that many counties failed to send any collections of fruit whatever—difficulty of transit in some cases, no organization in another, and possibly in some not a single man who would lift a finger to aid the cause. Perhaps in some, unforeseen obstacles arose; in our case a severe rain-storm postponing our local exhibition and detaining the steamer, prevented us from sending any contribution to the exhibition.

Up to 15th October only 7 out of 27 of the fruit circulars had been returned to me. At that date I mailed a postal card to the slow men, requesting an immediate return, as time was nearly up. I have waited now to the last moment. Many of the returns are incomplete or imperfect, so that I am compelled to abandon my intention of compiling the whole into a tabular form, and must rest content this time, with so inadequate a performance of my undertaking.

Whatever you may think worthy of record in the Report, I shall be pleased to see included in your next volume; there will possibly be enough to make the work desirable to members in Nova Scotia. Use my notes, and reject at pleasure.

Will you pardon me if I say a word about an index? Is it not indispensable? I wish to find, for instance, all that is said about *Aspidistum Conchiformis*, or Grime's Golden Pip-pin, or Glass Seedling Plum, or special points, if any, on soils, rain-fall or temperature. Is it not best to incorporate list of members in your annual volume as in 1872.

Very truly yours,

CHARLES E. BROWN.

Yarmouth, N.S., 26th Oct., 1874.

D. W. Beadle, Esq.,

Sec.-Treas. Fruit-Growers' Association,

St. Catharines, Ont.

COUNTY OF YARMOUTH, NOVA SCOTIA.

25th September, 1874.

1. Soil, Slate clay and gravel; loam inland.
2. Temperature, av. summer, 64°; highest, 80°; av. winter, 24°; lowest, 6°.
3. No frost from 15th May to 15th October.
4. Prevailing Winds, south and west from the ocean.
5. Varieties of Apples grown, 109 varieties on trial, of which 55 are kinds named in Report of Am. Pom. Society for 1873. Of these, Alexander, Canada Reinette, Chenango Strawberry, Duchess of Oldenburg, Early Harvest, Fall Jenneting, Fameuse, Fourth of July,

Gravenstein, Green Sweet, Grime's Golden Pippin, Haas, Hubbardston Nonsuch, Keswick Codlin, King of Pippins, King of Tompkins Co., Large Yellow Bough, Northern Spy, Peck's Pleasant, Primate, Red Astrachan, Ribston Pippin, Stark, Tetofsky, Wagener and Willow Twig are good or promising.

6. Best Six or Eight, Duchess of Oldenburg, Early Harvest, Fall Jenneing, Gravenstein, Keswick Codlin, Bough, Red Astrachan, Wagener and Andrew's Sweet, or Major Sweet, a local seedling, are best.

7. Blackberries, not cultivated, too cold on coast; inland wild are abundant.

8. Cherries do not succeed in any part of the County.

9. Cranberries, Upland, Gray and Marsh are abundant; not cultivated.

10. Currants, red, white, and black, all varieties do well; not troubled with insect.

11. Gooseberries succeed well, English and American; Yellow Amber best; no mildew.

12. Grapes, not grown, except in a few instances under glass.

13. Peaches, not grown, except in a few instances under glass.

14. Pears fail upon the coast, but succeed moderately inland. Bartlett, Beurre Diel, Duchess D'Angoulême, Flemish Beauty, Louise Bonne de Jersey, Seckel and others on trial.

15. Plums, Bradshaw, Columbia, Green Gage, Jefferson, Imperial Gage, Smith's Orleans, Washington are grown, mostly as wall-fruit on coast; inland succeed tolerably well in open exposure; no curculio or black knot,

16. Raspberries succeed well, all varieties; sometimes fail through winter killing; do best not covered.

17. Strawberries attain the highest standard in size and quality; Wilson's Albany grown chiefly; Jucunda next in favour, later, fairly productive, and of the largest size; have sent these to Mass. Hort. Society. Lennig's White not productive.

18. Quinces, none grown except under glass.

19. Insects and Remedies, Bark lice and a jointed beetle that infests blossoms of fruit trees are our worst enemies; soda wash, like whitewash, soapsuds, &c., remove the former, killing with the finger or hot water the latter.

20. Diseases and Remedies, canker upon apple and pear trees is the only disease among fruit trees; affects certain varieties chiefly; cause and remedy unknown, and anxiously sought for.

(Signed)

CHARLES E. BROWN.

CLYDE RIVER,

September 22nd, 1874.

DEAR SIR,—I have filled the accompanying up as well as I could, but very imperfectly. Fruit raising has not been followed to any extent in this County. A good many trees have been planted, but a large portion of them were American trees brought round by agents, no one knows where from, and these trees, as a general rule, did not do well—soon got diseased. Hence a damper to some extent was put upon planting apple trees. Then the most of people do not take enough care of them, and do not cultivate them properly. Up Clyde River and Shelburn River the soil is well adapted for apple raising, and some superior apples are raised there, but sufficient care in getting good varieties has not been taken.

Here the soil is rather dry and shallow for very successful culture of apples, but I make no doubt but skilful culture would be successful.

Small fruit has had very little attention given to it. The quantities raised are small; I think it a pity, for success, no doubt, would follow the attempt to raise them. I have not had very much experience, and have not been able to give the care and attention I would like, but I have been middling successful in raising strawberries, raspberries, and gooseberries. The raspberries are a kind I got in a garden at Barrington, of a pinkish orange color. I don't know their name. Hardy and productive.

I got a few plants last fall of the Clarke, and don't know yet how they will do. I also got a few plants of Kittatinny blackberry.

Cranberries grow wild in the bogs. Some years plenty, other years few.

Blueberries grow in abundance every year in some places. The white frosts on the river are somewhat of a drawback.

I have kept no record of temperature, and can give no average. The hottest and coldest I give from memory—it is cooler on the shore than back inland.

Yours, &c.,

M. G. HENRY.

Mr. Brown, Yarmouth.

COUNTY OF SHELBURNE, NOVA SCOTIA.

September 22nd, 1874.

1. Soil, sandy to sandy loam.
2. Temperature, average summer, don't know; highest, 85° to 90° ; average winter, don't know, lowest, 10° to 14° below zero.
3. No frost from May to September or October.
4. Prevailing winds, S. W. and W. in summer, E. in spring, very changeable in winter.
5. Varieties of apples grown, Greenings, Bishop Pippins, Gravenstein, Russets, Baldwin, natives of all varieties.
9. Cranberries, natives grow in bogs, which constitute quite a large portion of this County.
10. Currants, common red and black currants.
11. Gooseberries, American and English varieties, and native wild.
12. Grapes, none have been ripened so far as I know.
13. Peaches, none.
14. Pears, very few.
15. Plums, Damson, Greengages, &c.
16. Raspberries, Clarke's, Orange.
17. Strawberries, Wilson's, Jucunda, Triomphe d' Gand.
18. Quinces, Orange.

M. G. HENRY.

COUNTY OF QUEEN'S NOVA SCOTIA.

1. Soil, in northern district very fertile. In southern district, rocky, and generally unfit for cultivation, except with great cost.
2. Temperature, average summer, highest, 83° ; average winter, lowest, 15° .
3. No frost from June 10th, to September 1st.
4. Prevailing winds, North-West and South-West.
5. Varieties of apples grown, very few in S. district, except occasionally in gardens. In N. district many good orchards, Greenings, Non Pareils, Pearmain, for winter use prevail. Many varieties (poor) of summer apples, of not much use.
7. Blackberries, none.
8. Cherries, none.
9. Cranberries, one man only cultivates them—probably 50 bushels.
10. Currants, destroyed by small caterpillar, except in a few gardens where hellebore has been used.
11. Gooseberries, ditto.
12. Grapes, very few.
13. Peaches, none.
14. Pears, occasionally in gardens.
17. Strawberries, not to any extent.
18. Quinces, none.
19. Insects and remedies, for currant caterpillar, powdered hellebore a specific. Has been effectually tried here.

HENRY S. FARREL.

NORTHERN DISTRICT OF QUEEN'S COUNTY, NOVA SCOTIA.

September 14th, 1874.

1. Soil, clayey (granite and greystone), good grazing.
2. Temperature, summer, highest, 80°.
3. No frost from 1st June to 15th Sept., generally none severe enough to hurt beans on hill tops, but low lands suffer.

Some seasons frost kills tender plants early in June, but this season we escaped June frosts; but pumpkin, squash, &c., and tomatoes were struck early in September.

4. Prevailing winds, North-West in winter and South-West in summer.
5. Varieties of apples grown, Greenings and other winter varieties, and Pumpkin Sweet with a great many kinds of cooking.
6. Best six or eight, Bishop Pippin, Nonpareil, Greenings, Bow, Red Astrachan, August Pippin.

7. Blackberries grow wild.
8. Cherries, English and small red.
9. Cranberries grow wild on low land swamps.
10. Currants, red and white.
11. Gooseberries, English and native cultivated.
12. Grapes, few if any raised.
13. Peaches, none.
14. Pears, very few, do not know the names.
15. Plums, common purple and gages.
16. Raspberries, none cultivated, grow wild.
17. Strawberries, few raised, white and red.
18. Quinces, do not know of any.
19. Insects, Curculio, caterpillar.
20. Diseases and remedies, apples often wormy, but do not know that any remedy is used, but to destroy caterpillars.

Some kinds of apple-trees are injured or the injury is manifest by the bark turning dark on one side, and extending up and down the trunk and in a few years dying. Some think it is caused by the frost, some the sun. Some that the kind of tree is not hardy enough for the climate.

J. M. FREEMAN.

COUNTY OF PICTOU, NOVA SCOTIA, 1874.

1. Soil varying from gravelly to argillaceous.
2. Temperature, 1873, average summer, 56·7; highest, 85·3; average winter, 25·9; lowest, 10°.
3. No frost from May 11th to October 30th.
4. Prevailing winds in summer S.W., winter N.W.
5. Varieties of apples grown, a great variety ungrafted, and also various kinds grafted; but the following are the
6. Best six or eight, Red Astrachan, Gravenstein, Emperor Alexander, Early Harvest, Winter Baldwin, Summer Baldwin, Sops of Wine, English Russet, Dutchess of Oldenburgh and Pomme Gris.
7. Blackberries not much cultivated.
8. Cherries, May Duke, Black Heart and Common Red.
9. Cranberries only grown wild.
10. Currants, red, white and black.
11. Gooseberries cultivated in large variety.
12. Grapes cultivated in large variety.
13. Peaches not much cultivated.
14. Pears, English Jargonell and Bartlett; also a few other sorts, but not so much in favour.

15. Plums, Green Gage, Orleans, Large Blue, Damson, McLaughlin, Large Purple, Egg Plum (white), Imperial Gage and Sugar Plum—very fine.
16. Raspberries, red and white in variety.
17. Strawberries cultivated in large variety
18. Quinces not much cultivated.
19. Insects and remedies.—The tree borer is the greatest enemy to the fruit-grower and probing is found to be the most satisfactory remedy.
20. Diseases and remedies—The bark louse very prevalent, strong salt water applied first week in July is found very satisfactory remedy.

DAVID MATHESON,
Member Central Board of Agriculture for Province of Nova Scotia.

COUNTY OF KING'S, NOVA SCOTIA.

October 17th, 1874.

1. Soil, valley—sandy loam, and close to the mountains—stiff loam and clay.
2. No frost from say 10th May, to 20th October, as a general thing.
3. Prevailing winds, westerly during summer and autumn, easterly to spring.
4. Varieties of apples grown, almost numberless—most common Gravenstein, Yellow Bellefleur, Baldwin, Greening, Nonpareil, Ribston Pippin, Vandvere, Æsopus Spitzenburg, Porter, Emperor Alexander, &c.
5. Best six or eight, the first six named.
6. Blackberries not often cultivated.
7. Cherries, several varieties, Blackheart, Oxheart, Black Tartarian.
8. Cranberries seldom cultivated, occasionally grow in bogs.
9. Currants formerly largely grown, but now mostly destroyed by the currant worm.
10. Gooseberries not generally cultivated—affected same as currants.
11. Grapes, grown by very many persons, but few to perfection, for want of proper information.
12. Peaches, seldom grown.
13. Pears, grown quite extensively, and increasing.
14. Plums, formerly largely grown, Blackheart destroying the trees, no remedy yet discovered.
15. Raspberries, not grown for market, by a few for family use.
16. Strawberries, grown by very many persons, and with much profit.
17. Quinces, grown by many persons, almost a failure this year.
18. Insects and Remedies, Caterpillar, Canker-worm, &c,

C. C. HAMILTON.

COUNTY OF KING'S, NOVA SCOTIA.

October, 17th, 1874.

1. Soil, in the valley is mostly red loam, much of it sandy near the mountains; more clay occurs on the south mountain, it is slaty and stony, but produces fair fruit, north mountain is too much exposed to fog from the Bay of Fundy.
3. No frost from 15th May to 20th October, usually.
4. Prevailing winds, east and north-east during May, afterward west and north-west.
5. Varieties of Apples grown, is large and still increasing from imported trees, causing great confusion in nomenclature. A collection of over 200 varieties was exhibited at Halifax this month, most of which grew in King's County, and many more could have been found. Add to the printed list enclosed a few early varieties, such as Early Harvest, Red Astrachan, Duchess of Oldenburg, and you have all the most valuable proved varieties.

Gravenstein.
 Yellow Bellefleur.
 Ribston Pippin.
 Baldwin.
 Nonpareil Russet.
 Rhode Island Greening.
 King of Tomkins County.
 Blenheim Pippin.
 Northern Spy.
 Blue Pearmain.
 Emperor Alexander.
 Hubbardston Nonsuch.
 Æsopus Spitzenburg.
 Gloria Mundi.
 Lyman's Pumkin Sweet, or *Pound Sweet*.
 Calkin's Pippin.
 Chenango Strawberry.
 Colvert.
 Porter.
 Fall Jenneting (*Canada Reinette*).
 Drap d'Or.
 Westfield Seek-no-further.
 Chebucto Beauty.
 Flushing Spitzenburg.
 Twenty oz. Pippin.
 Pomme Gris.

Talman's Sweet.
 Munson's Sweet.
 Bishopsbourne.
 Dutch Codlin.
 Keswick Codlin.
 Golden Russet.
 Sweet Russet.
 Clyde Beauty.
 Broadwell.
 William's Early.
 Early Bough.
 Golden Pippin.
 Snow Apple, or *Fameuse*.
 King of the Pippins.
 Canada Reinette.
 Roxbury Russet.
 Yorkshire Greening.
 Minister.
 Delaware Harvey.
 Morton's Red.
 St. Lawrence, or *York*.
 Fall Pippin.
 Yellow Newton Pippin.
 Beauty of Kent.
 Calkin's Early.

6. Best six or eight, taken as they stand in the list for general value say first 10 best. Ribston Pippin not profitable on sandy soils, wants deep moist loam or limestone soil or the fruit falls before maturity. Yellow Bellefleur best on dry sandy soils.

7. Blackberries not much cultivated. Lawton winter kills to the snow line. A native variety called "Green Cane" does best, as it is perfectly hardy and very good.

8. Cherries, all the best sorts seem to succeed so far as tried.

9. Cranberries, don't know of any being cultivated in this County.

10. Currants, have been a failure from the ravages of currant worm for some years past, unless very great pains is taken, and plenty of Hellebore used. Kinds, White and Red Dutch.

11. Gooseberries, English varieties are subject to mildew. Houghton's Seedling does well.

12. Grapes successfully grown with wall protection.

13. Peaches do best as Espaliers on south wall, occasionally do well as Standards if close pruned.

14. Pears. — The cultivation of this fine fruit is rapidly increasing both on quince and as Standards. Bartlett, Flemish Beauty, Beurre Bosc, Beurre d'Anjou, Clapp's Favourite, Sheldon, Stevens' Genesee, Onondaga, Louis Bonne de Jersey, Duchess d'Angoulême, and many others are grown to a considerable extent. Some of our native pears are considered equal if not superior in many respects to those named "Maria," "Burbige," "Alison," Great Britain, &c., are best.

15. Plums are considered a failure this year from cold weather at the season of blossoming. A great deal of black knot has made its appearance this year. They generally do well, if the curculio can be kept in subjection; sorts cultivated as per printed list most profitable are Egg, Large Blue, Sweet Waters and Gages in variety, and Damson.

Nectarine.
 Imperial Gage.
 Princes Yellow, or Flushing Gage.
 Green Gage.
 Drap d'Or.
 Washington.
 Prince of Wales.

Smith's Orleans.
 Sharp's Emperor.
 Reine Claude de Bavy or *Bavys Gr*.
 Lombard.
 Jefferson.
 Coc's Golden Drop.
 McLaughlan.

Lawrence Favourite.
 Royal de Tours.
 Orleans.
 Duane's Purple.
 Imperial Violette.
 Red Gage.

Blue Imperatrice.
 Yellow Egg or Magnum Bonum.
 Damson.
 Sweet Water.
 Large Blue.

16. Raspberries not much cultivated, except by Amateurs. Scotch White, New Red An-trop, Franconia, Fastolf, hardy and good, Brinkles Orange too^ttender, Blackcaps not fancied, Clarke and Philadelphia not yet tried.

17. Strawberries, profitable when well cared for, area increasing; Wilson, Triomphe de Gand, next Jucunda doing well; Agriculturist, Brooklyn Scarlet, Scott's Seedling, Hovey and many others have been tried with more or less success.

18. Quinces do well in favourable situations, seem to require a deep moist loam well cultivated.

19. Insects and Remedies, *Curculio*—mallet and sheet, a bag of Air-Slaked Lime on a pole shook over the tree when wet, has had good effect when thoroughly done. *Curran worm*, Hellebore is best. Lime is effectual if used often. *Slug* on cherry and pear—Lime Bag, *Bark Louse*—I have found a mixture of Lime, Soft Soap and Sulphur, well brushed on to be the best.

20. Diseases and Remedies.—As a rule diseases attack neglected or injudiciously cultivated trees; over stimulation is worse than neglect, and to it may be ascribed two-thirds of all winter-killing, frost blight, fire blight, &c., &c., that occurs. Thorough drainage to ensure early ripening of the wood, with judicious pruning and pinching back, cultivating the soil during the early months of summer only, so as not to stimulate late growth, and we will have little disease to combat.

R. W. STARR,
Starr's Point, Cornwallis

COUNTY OF KING'S, NOVA SCOTIA.

Berwick, 1874.

1. Soil, near our mountains heavy clay, other localities sandy loam to clear sand, with some spots of clay.

2. Temperature. Have had frost every month, I think, this summer.

3. No frost from July 1st to October 1st, ordinary year.

4. Prevailing winds, west and north-west.

4. Varieties of apples grown, Red Astrachan, William's Early, Early Bough, Chenango Strawberry, Striped Gilliflower, Porter, Gravenstein, Munson Sweet, Emperor Alexander, Calkin's Early, Sops of Wine, Early Harvest, Transparent Moccasin, Duchess of Oldenburg, St. Lawrence, Sutton's Early, Ribston Pippin, Yellow Bellefleur, Greening, Baldwin, Nonpareil, Northern Spy, Blenheim Pippin, King of Tompkin's County, Pomme Gris, Æsopus Spitzenburg, Blue Pearmain, Snow Apple, Calkin Pippin, Hubbardson's Nonsuch, Flushing Spitzenburg, Fall Jenneting, Gloria Mundi, Canada Reinette, Westfield Seek-no-further, Salmon Sweet, Pound Sweet, Broadsweet, Drap D'Or, King of Pippins, Keswick Codlin, Rhymer Pippin, Yellow Newton Pippin, St. Lawrence. These with few exceptions are grown around here.

5. Blackberries, none cultivated about here.

6. Cherries, common.

7. Cranberries, wild plants cultivated to some extent.

8. Currants, black, common red and white.

9. Gooseberries, Houghton's Seedling, but very few.

11. Pears, Orband's Summer, Summer Bell, Burbidge, Curran or Maria, Bartlett, Spice, Great Britain, Clapp's Favorite, Sheldon, and a numerous variety of small pears for which no name is offered.

12. Plums, Green Gage, Prince's Imperial Gage, Prince of Wales, Magnum Bonum, Purple Sweet Water, Coe's Golden Drop, Bolmar's Washington, Lombard, Jefferson,

Flushing Gage, Frost Plum, Nectarine, D'Or, Smith's Orleans, Sharp's Emperor, Red Gage, Royale de Tours, Duane's Purple, Imperial Violette, Large Blue.

Strawberries, Wilson's Albany, Triomphe de Gand, Jucunda, Agriculturist, Boston Pine, Kentucky Seedling, Chas. Downing, Prince of Wales, Lenning's White, Mary Fletcher."

Quinces, A few grown, can't give variety.

R. E. SYDEND,
Berwick.

COUNTY OF KING'S, NOVA SCOTIA

October, 1874.

1. Soil, the valley is chiefly sandy loam.
2. Temperature, summer highest, 86° above ; winter lowest 10° below.
3. No frost from 10th of June, to 10th of October.
4. Prevailing winds, westerly.
5. Varieties of apples grown, apples are very extensively grown and we have all the improved varieties that can be obtained. Fruit-growing is a specialty, 300 to 400 varieties.
6. The best are Gravenstein, Ribston Pippin, Yellow Bellefleur, Baldwin, Greening, Nonpareil, Northern Spy.
7. Blackberries, not cultivated extensively ; wild, plentiful.
8. Cherries, different varieties grown for home consumption.
9. Cranberries, a few wild, but none cultivated.
10. Currants, greater part destroyed by currant worm the last three years, before that did well.
11. Gooseberries, greater part destroyed by currant worm the last three years ; before that did well.
12. Grapes, hardy varieties cultivated in the open air.
13. Peaches, not grown except in sheltered localities.
14. Pears, grown pretty extensively of all varieties, the leading are the Bartlett, Great Britain, Spice, &c.
15. Plums, a great many varieties grown ; some of the best are Sweet-water, Gages, Nectarine, Damson, &c.
16. Raspberries, Red and White cultivated, and large quantities of wild ones.
17. Strawberries, different varieties cultivated to some extent, wild ones plentiful.
18. Quinces, not extensively cultivated, grow well.
19. Insects and remedies, apple-tree worms kill them—Currant worm—hellebore and lime is used—borers.
20. Black knot on plum tree—no known remedy.

JONATHAN RAND.

COUNTY OF HANTS, NOVA SCOTIA.

28th September, 1874.

1. Soil ; I prefer sandy loam, inclined to clay sub-soils, for orchard culture, but for plum orchard more clay.
2. Temperature. The highest last summer was 77, and the lowest last winter was 16 below zero.
3. No frost from the 11th May to this day, 28th Sept. To-day the thermometer is up to 68 in the shade (one o'clock).
4. Prevailing winds ; last spring, and to the 25th of June, wind was north-east, and since that north and north-west mostly.
5. Varieties of apples grown ; I have over fifty, and for early I prefer the Spitzenburg. William's Early and Orange Sweet ; for later sorts Gravenstein, but it requires high culture, Bishop Pippin, Baldwin, Ribston Pippin, Greening ; Northern Spy shy bearer, till the tree gets old and high culture.

6. Best six or eight.—These do in this locality pretty well, under moderate culture. I have a number of foreign apple trees that I do not propagate from—they have proved worthless.

7. Blackberries ; none cultivated.

8. Cherries ; the tree grows well here, but bears very few cherries lately.

9. Cranberries ; none cultivated.

10. Currants ; subject to blight on the leaf before the fruit is ripe.

11. Gooseberries used to do well here, but of late years caterpillars ruin them.

12. Grapes ; I have three of the hardiest sorts, they bear but do not ripen well.

13. Peaches ; I had three sorts of them, but the winter of 1872 killed them all.

14. Pears ; the hardiest varieties would do well here, but the people in general do not go in to cultivate them. Some years ago there were a great number of dwarf pear trees came from the United States, which all died by the fourth year, that discouraged people from planting many.

15. Plums ; I had a trial of 18 varieties of them, and found the White and Yellow Gage Red Gage, and Magnum Bonum to do the best, in common culture, here.

16. Raspberries ; not many cultivated. The foreign kinds require protection in the winter.

17. Strawberries ; not many cultivated in East Hants ; the people depend on the native sorts, the foreign sorts would do well here, by good culture and some protection in winter.

18. Quinces are not much known in East Hants, but where they have been tried they do pretty well.

19. Insects and Remedies. The worst enemy the apple tree has is the Bark Louse or Scale. If not washed with strong soft-soap suds they would soon kill the tree ; some put tobacco in the suds with good effect.

20. Diseases and Remedies. The plum tree is subject to a disease called the punk rot ; it commences or shows early in the spring by a burst or split in the inner bark, which gradually swells to a long callis, first green and then turns black. The best remedy that I know of is to pare the affected part, as soon as seen, with a sharp knife. The whole of the affected parts must be cut out and bathed with solution of vitriol ; as soon as it dries cover over with grafting wax, it will soon heal over, but if the sore is an old one the best plan is to cut the whole limb off and burn it. I think the best preventive against this disease is not to plan too deep, which is against all stone fruit trees, and also to keep all weeds and grass from growing on the ground they stand on, and also to have the land only moderately rich, and not have an overgrowth of young wood. Salt is good dressing for plum trees, say one bushel for eight or ten bearing trees, also the sweepings around the anvil in the blacksmith's shop ; lime is good dressing to make them bear well, and also to kill the curculio in its chrysalis state. These should be mixed and applied as a dressing, as soon as the frost is out of the ground, in the spring.

WILLIAM FERGUSON.

COUNTY OF HALIFAX, NOVA SCOTIA.

DARTMOUTH, 1874.

RAIN FALL AT THE BRAE, DARTMOUTH.

	Inches.
January, 1874	2·84
March	1·91
April	2·77
May	4·20
June ..	7·03
July	2·05
August	2·78
September	4·54
To 19th October	2·01

1. Soil, clay.

2. Temperature, Av. Summer, 50° ; highest, 75° ; Winter, lowest, 10° below zero.

4. Prevailing Winds, west winds.

5. Varieties of Apples grown, none.

The situation of my residence—about 200 feet above tide and one mile from Halifax Harbour—prevents the successful growth of the apple. The fruit it is true will grow, but generally speaking with little flavour. Stone fruit, such as cherries, plums, &c., succeed much better. I have found, by the experience as an amateur of 25 years, that the climate of the sea-board N.E. and S.W. of our harbour is not adapted to the cultivation of the apple.

10. Currants, 30 quarts.

12. Grapes, 50 pounds in cold grapery.

16. Raspberries, 30 quarts.

17. Strawberries, 140 ditto.

G. A. S. CRICHTON.

COUNTY OF DIGBY, NOVA SCOTIA, 1874.

2. Temperature, average summer, 60°; highest, 56°; average winter, 16°; lowest 89°

3. No frost from 8th May to 5th September, 1874.

4. Prevailing winds, summer S.W., winter N.W.

5. Varieties of apples grown, Early Bough, Gravenstein, Nonpareil, Bellevan, Rhode Island Greening, Blue Pearmain, Bishop Pippin, Spitzenburg, Christmas Apple *so called*.

6. Best six or eight, Early Bough, Gravenstein, Ribston Pippin, Nonpareil.

7. Blackberries, very plentiful.

8. Cherry trees grow well, yield very abundantly.

9. Cranberries grow wild; not much cultivated.

10. Currants, abundant; somewhat injured by currant worms.

11. Gooseberries, currant worm very destructive.

12. Grapes, not many grown.

13. Peaches, not many grown.

14. Pears do well; not many grown.

15. Plum trees, black lumps—nearly all dead.

16. Raspberries, grown finely.

17. Strawberries, plenty both wild and cultivated.

18. Quinces, grown quite plentiful.

19. Insects and Remedies.—Currant worm very destructive; no remedy.

JOHN DAKIN.

COUNTY OF CUMBERLAND, NOVA SCOTIA.

October 1st, 1874.

1. Soil, gravelly.

3. No frost from June to early in September.

4. Prevailing winds, south-west.

5. Varieties of apples grown. Generally no particular species.

7. Blackberries not cultivated.

8. Cherries, ordinary varieties.

9. Cranberries not cultivated.

10. Currants, white, red and black.

11. Gooseberries, English.

12. Grapes, not grown.

13. Peaches, not grown.

14. Pears, a few varieties.

15. Plums, almost all killed with Black Knot.

16. Raspberries, white.

17. Strawberries, white and red.

18. Quinces, not grown.

Horticulture is only beginning to receive any attention here.

HIRAM BLACK,

COUNTY OF DIGBY, NOVA SCOTIA.

September 21, 1874,

1. Soil, loam, clay and gravel and sandy soil.
4. Prevailing Winds, South-west.
5. Varieties of Apples grown, Sweet Bough, German Bough, Hubbardston Nonsuch, Gravenstein, Fall Jenette, Spitzenburg, Yellow Bellefleur, Northern Spy, Snow Apple, Red Astrachan, Nonpareil, Roxburgh Russett, Belleveau, Red Streak, Breton Stripe, 20 oz. Pippin, Hankinson Apple, Colvert, Newtown Pippin.
7. Blackberries, grow well, all kinds.
8. Cherries, grow well, all kinds.
9. Cranberries, grow well, all kinds.
10. Currants, grow well, all kinds.
11. Gooseberries, grow well, all kinds.
12. Grapes, Isabella, Northern Muscadine, Concord.
13. Peaches, winter kills.
14. Pears, Flemish Beauty, Bartlett's, Belle Luerative, Louise Bon de Jersey, Vicar of Winkfield.
15. Plums, Yellow Egg Plum most safe.
16. Raspberries, all sorts grow well.
17. Strawberries, all sorts grow well.
18. Quinces, all sorts grow well.
19. Insects and Remedies. Currant and bush insects ; best remedy, saltpetre.

COLIN CAMPBELL.

PANSBOROUGH, CUMBERLAND COUNTY, NOVA SCOTIA.

12th September, 1874.

DEAR SIR,—I received yesterday your printed circular of the 25th ult., wishing information on the growing of fruit in this locality, to be communicated to the Secretary of the Ontario Fruit-Growers' Association at St. Catharine's, Ontario. Subjoined are remarks opposite each particular, and each kind of fruit named in the circular.

Yours respectfully,

T. D. DICKSON.

Charles E. Brown, Esq.,

Yarmouth, Nova Scotia.

1. Soil, clay loam, and dry, gravelly soil where cultivated ; there are ravines, meadows, swamps and marshes.
 2. Temperature—average in summer, about 60 ; do., in winter, about 20 ; highest in summer, about 80 ; lowest in winter, about 15.
 3. No frost from the 1st June to the 1st November, except occasional light frosts in low places and along the margins of rivers and lakes.
 4. Prevailing winds, south-west and west.
 5. Varieties of Apples grown.—Old orchards have been grafted and new orchards set out lately, embracing the following varieties, viz. :—Baldwins, Rhode Island Greenings, Roxburgh Russet, Pearmain, Ribston Pippin, Bishop Pippin, Monster Pippin, Long Pippin, Early Harvest, Golden Ball, Autumn Strawberry, Red Astrachan, Porters, Strasburg's, Gravensteins, American Sweet, Emperor Alexander, Danvers' Winter Sweet, Wine Apple, Hubbardston's Nonsuch, Minister, Maiden's Blush.
- Best six or eight—none at hand to form an estimate.
7. Blackberries—four varieties ; grows without cultivation, and bears plentifully.
 8. Cherries, not many cultivated, but grow and bear well.
 9. Cranberries plentiful on dry plains, and some on bogs ; two varieties ; none are cultivated.
 10. Currants, grown in gardens and bear very well.
 11. Gooseberries, plentiful crop this year, growing wild.
 12. Grapes—nil.
 13. Peaches—nil.

14. Pears—nil.
 15. Quinces—nil.
 16. Plum trees grow and bear very well, but die in a few years with black knot.
 17. Raspberries plentiful, generally in pastures and among windfalls and brush ; none are cultivated.
 18. Strawberries, plentiful ; generally growing wild, but few are cultivated.
 19. Diseases and Remedies.—Ashes have been lately recommended as a preventative for the black knot on plum trees.
 20. Insects and Remedies.—Worms in apples, and caterpillars on trees are sometimes injurious ; otherwise fruit or fruit trees here are seldom troubled with insects.
- N.B. The foregoing remarks apply more particularly to Pansborough, Upper Maccon, and Apple River in this County. There might be some variation if applied to the whole of the County, which embraces, besides the places mentioned, the Villages and Settlements of Amherst, Lower Maccon, Nappan, Minudie, Pugwash, Fort Lawrence, River Philip, Wallace and Westchester.

T. D. DICKSON.

COUNTY OF ANNAPOLIS, NOVA SCOTIA.

October 15th, 1874.

1. Soil, Loam, clay, and sand.
2. Temperature, average summer, 65°, highest, 93° ; average winter, 28°, lowest, 15° below zero.
3. No frost from June 1st to September 20th.
4. Prevailing winds, S.-W. and W.
5. Varieties of apples grown, Gravenstein, Ribston Pippin, Northern Spy, Blenheim Pippin, Yellow Bellefleur, Nonpareil, Æsopus Spitzenburg, Flushing Spitzenburg, R. I. Greening, Concord, Pearmain, King of Tompkin's County, Chenango Strawberry, Summer Bellefleur or Porter, Delaware, Harvey, &c., &c.,
6. Best six or eight, Gravenstein, Northern Spy, Yellow Bellefleur, Rhode Island Greening, Nonpareil, Æsopus Spitzenburg, King of Tompkin's County, Blenheim Pippin, &c., &c.
7. Blackberries, High Blackberry, Black Birch, and Trailing Blackberry.
8. Cherries, Common English, White Heart, Black Heart, and summer Black Cherry.
9. Cranberries, Common Red, and White Antwerp.
10. Currants, Common Red, Dutch Red, and White Crystal, mainly.
11. Gooseberries, Common Wild, Large English, Early Green Hairy.
12. Grapes, Black Hamburgh, Isabella, and Sweet Water, mainly.
13. Peaches, but one or two varieties grown here, varieties not known.
14. Pears, Louise Bonne de Jersey, Bartlett, St. Lawrence, Large Bill, Winter Seckel, and Summer Bill and Beauty, Peach Plum, Red and White Magnum Bonum.
15. Plums, Common Black, Green Gage, Frost Egg.
16. Raspberries, Red and American White and English, American Black.
17. Strawberries, Wilson's Albany, Hovey's Seedling, American Scarlet, Triomphe de Gand, Prolific or Conical, mainly.
18. Quinces, Orange, and Pear shape.
19. Insects and remedies, Borer Caterpillar, Canker Worm, Bark Louse, and Apple Worm.
20. Diseases and remedies, Spirits of Ammonia applied to the nest with a sponge, good to destroy caterpillars ; for canker worms, a bit of tarred canvas around the trunk, a good protection.

AVARD LONGLEY.

COUNTY OF VICTORIA, NOVA SCOTIA.

October 22nd, 1874.

1. Soil, alluvial and red sandstone soil.
2. Temperature is mild in summer and winter.

3. No frost from the 15th June, to the 15th of August.
4. Prevailing winds, West and North-West.
5. Varieties of apples grown ; as most of the apple trees raised here are varieties from home-raised trees, no name can be given. Siberian Crabs do well. Imported trees not yet bearing—nothing can be said about them.
7. Blackberries, not cultivated here ; are growing wild.
8. Cherries, not cultivated here.
9. Cranberries, a few growing wild.
10. Currants, destroyed by caterpillars.
11. Gooseberries, do.
12. Grapes, none.
13. Peaches, none.
14. Pears, none.
15. Plums, Brown plums raised in large quantities.
16. Raspberries, growing wild plentifully.
17. Strawberries, do. do.
18. Quinces, none.
19. Insects and remedies ; insects very numerous, but no remedy.

JOHN MCLENNAN.

P.S.—Summer frosts are so prevalent here that orchard culture is not much attended to. There are a number of orchards, but the trees raised here are from different varieties of apples, and no system of pruning or grafting was ever introduced. But now a number of young trees are imported from Nova Scotia, and promise to do well. A large quantity of apple and other fruit trees have been sold here by parties from the United States, which did well for a couple of years, but afterwards died out. The Nova Scotia varieties do better here.

J. McL.

COUNTY OF ANNAPOLIS, NOVA SCOTIA.

1. Soil, loam and sandy loam.
2. Temperature—average summer, highest, 75 ; average winter, lowest, 15.
3. No frost from May 1st to November 1st.
4. Prevailing winds, westerly.
5. Varieties of Apples grown.—Nonpareils, Greenings, Baldwin, Northern Spy, Yellow Bellefleur or Bishop Pippin, Ribston Pippin, Gravenstein, Emperor Alexander, &c., &c.
6. Best six or eight—Nonpareils, Greenings, Baldwin, Northern Spy, Gravenstein, Yellow Bellefleur.
7. Blackberries, few cultivated.
8. Cherries, not grown to any extent in this Section.
9. Cranberries, not cultivated.
10. Currants, suffered by worm for the last three years.
11. Gooseberries, not much cultivated.
12. Grapes, some grown do pretty well.
13. Peaches, some grown do pretty well.
14. Pears, Bartlett, Flemish Beauty, Duchesse d'Angouleme, Great Britain, &c., &c.
15. Plums, different varieties ; total failure this year.
16. Raspberries, little cultivated.
17. Strawberries, different varieties, considerably grown.
18. Quinces, some grown.
19. Insects and Remedies—currant worm ; sift wood ashes on bushes.

CHAS. B. WHITMAN.

COUNTY OF LUNENBURG, NOVA SCOTIA.

October, 1874.

4. Prevailing winds, south,
5. Varieties of Apples grown,—Baldwin, Gravenstein, Emperor Alexander, Northern Spy, Astrachan, Chenango Strawberry, Sweet Bough, Crab Apples.

7. Blackberries, very few.
8. Cherries, Black-heart and common.
9. Cranberries, none but wild.
10. Currants, Red, Black and White.
12. Grapes, Isabella ; a small quantity.
14. Pears, Bartlett and common.
15. Plums, common varieties.
16. Raspberries, white.
17. Strawberries, the English or Garden.
18. Quinces, none.

B. ZWICKER.

COUNTY OF LUNENBURGH, NOVA SCOTIA,

October, 1874.

5. Varieties of Apples grown :—

Flushing Spitzenburg.
 Æsopus Spitzenburg.
 Baldwin.
 Fall Pippin.
 Gravenstein.
 Hubbardston Nonsuch.
 Northern Spy.
 R. I. Greening.
 S. Strawberry.
 Winter Pearmain.
 Elgin Russet.
 Golden Russet.
 Yellow Bellefleur, or Bishop's
 Pippin of N.S.
 Emperor Alexander (bearing).
 Astrachan.
 Swar.
 Chenango Strawberry (bearing).
 Baldwin.
 Sweet Bough.
 Domine.
 Crab Apple.
 Transport.

Transcendant.
 Soulard.
 Duchess of Oldenburg.
 Nonpareil.
 Twenty Ounce Apple.
 Grime's Golden Pippin.
 Keswick Codlin.
 King of Tompkins Co.
 Lyman's Large Summer.
 Large Yellow Bough (bearing.)
 Northern Spy.
 Pine Apple.
 Housewife.
 Pomme Gris.
 Red Astrachan.
 Rhode Island Greening.
 Ribston Pippin.
 Roxbury Russet.
 St. Lawrence.
 Swaar.
 Twenty Ounce.
 Wagener.
 Cogswell.

8. Cherries ; English Cherry.
 12. Grape ; Concord.
 14. Pears ; Clapp's Favourite, Lawrence, Louise Bonne de Jersey, Flemish Beauty, Bartlett, Swan's Orange, Summer Curran.
 15. Plum ; Bradshaw, Coe's Golden Drop, Green Gage, Lombard, Washington, Yellow Egg.
 17. Strawberry ; Wilson's Albany (bearing) best kind, Jucunda or Knox's, 700.
- All of these trees, bushes and plants have been planted two and four years, and are doing very well for the time that they were planted. Dark loam land.

E. B. HYSCN.

REPORT OF AUDITING COMMITTEE.

TORONTO, 19th Nov., 1874.

We certify that we have examined the accounts and vouchers submitted, together with the Auditor's statement, by the Treasurer of the Fruit-Growers' Association, up to the 18th

November, and find the payments to have been made in accordance with the direction of the Board of Directors of the Fruit-Growers' Association.

(Signed,) GEO. LESLIE, JUN.,
CHARLES ARNOLD,
PETER C. DEMPSEY,
GEORGE ELLIOTT,
Committee.

PREMIUMS FOR ESSAYS.

The Directors offer the following premiums:—

First.—TWENTY-FIVE DOLLARS for the best essay on the cultivation of the pear, including the mode of keeping and ripening the fruit, together with a short description of the varieties with which the writer is acquainted, and his opinion on the merits of each.

Second.—FIFTEEN DOLLARS for the second best essay on the pear, as above.

Third.—TWENTY-FIVE DOLLARS for the best essay on the cultivation of the cherry, together with a short description of the varieties with which the writer is acquainted, and his opinion of the merits of each.

Fourth.—FIFTEEN DOLLARS for the second best essay, as above.

Fifth.—TWENTY-FIVE DOLLARS for the best essay on *where* and *how* to market our fruits.

Sixth.—FIFTEEN DOLLARS for the second best essay, as above.

Seventh.—TWENTY-FIVE DOLLARS for the best essay on the best methods of utilizing our surplus autumn fruits.

Eighth.—FIFTEEN DOLLARS for the second best essay, as above.

NOTE.—Essayists must send their papers to the Secretary, on or before the 1st day of November, 1875, each inscribed with a motto, accompanied by a sealed note, endorsed with the motto inscribed in the essay, and containing within, the name of the author. Judges may withhold the prizes if they do not consider the essays worthy.

DISTRIBUTION OF FRUIT TREES.

The Directors are making arrangements to distribute to all members of the Association, the following trees and plants, in the several years mentioned below:—

1875.

SWAYZIE POMME GRIS APPLE,

And either the Goodale Pear, or the Flemish Beauty.

1876.

GLASS' SEEDLING PLUM.

1877.

NEW CANADIAN HYBRID RASPBERRIES,

Raised by William Saunders and Charles Arnold.

1878.

THE "BURNET GRAPE."

Raised by P. C. Dempsey.

1879.

NEW CANADIAN HYBRID APPLE,

Raised by Charles Arnold.

1880.

THE SOUVENIR DU CONGRES.

MEETINGS FOR 1875.

Summer meeting at Drummondville.

The Autumn meeting at Belleville.

The particular day of each meeting will be specified by circular.

PRIZE LIST.

PERMANENT PRIZES.

First.—AN HONORARY MEDAL to the originator of any new fruit, which, having been thoroughly tested for a series of years, is found to be worthy of being placed among the fruits of its class for cultivation in Ontario.

Second.—FIFTY DOLLARS for the best Canadian Seedling Late Winter Apple, to be at least equal to the old popular varieties now in cultivation.

Third.—THIRTY DOLLARS for the best Canadian Seedling Harvest Apple of like merit.

Fourth.—TWENTY DOLLARS for the Best Canadian Seedling Autumn Apple of same excellence.

ANNUAL PRIZES.

PRIZES FOR 1875.

First.—Awards may be made by the Committee on Seedling Fruits of sums *not exceeding Ten Dollars* for any seedling fruit that may be submitted to them during the year, which they may deem worthy, although they may not yet be prepared to advise the Directors to bestow either of the permanent prizes. Such award shall not in any measure disqualify the exhibitor from eventually receiving, for the same fruit, one of the permanent prizes.

Second.—FIVE DOLLARS for the best Winter Seedling Apple, fruit to be grown in 1875, and exhibited at the succeeding winter meeting of the Association.

Third.—FIVE DOLLARS for the best Autumn Seedling Apple, to be shown at the next Provincial Exhibition.

Fourth.—FIVE DOLLARS for the best Summer Seedling Apple, to be sent when in condition for examination, to the President, Rev. R. Burnet, Hamilton, all charges prepaid, and to be by him submitted to the Committee on seedling fruits.

Fifth.—FIVE DOLLARS for the best Seedling Winter Pear, fruit grown in 1875, and exhibited at the succeeding Winter Meeting of the Association.

Sixth.—FIVE DOLLARS for the best Seedling Autumn Pear, to be shown at the Provincial Exhibition.

Seventh.—FIVE DOLLARS for the best Seedling Summer Pear, to be sent, when in condition to be examined, to the President, Rev. R. Burnet, Hamilton, carriage prepaid, for submission to the Committee on seedling fruit.

Eighth.—FIVE DOLLARS for the best Seedling Plum, to be sent to the President when in season.

Ninth.—FIVE DOLLARS for the best Seedling Peach, to be sent to the President when in season.

Tenth.—FIVE DOLLARS for the best Seedling Grape, of any colour, to be sent to the President when ripe.

Eleventh.—FIVE DOLLARS for the best Seedling Strawberry, to be sent, if possible, to the Summer Meeting; if not possible, then to the President.

Twelfth.—FIVE DOLLARS for the best Seedling Raspberry, to be sent, if possible, to the Summer Meeting; but if that be impracticable, then to the President, when in season.

Thirteenth.—FIVE DOLLARS for the best Seedling Gooseberry that is not subject to mildew, whether of European or American parentage, or a cross between them; to be sent to the Summer Meeting, if possible, otherwise to the President.

Fourteenth.—FIVE DOLLARS for the best Seedling Blackberry sufficiently hardy to endure the climate of Ontario. Fruit to be sent to the President, when ripe.

Should two or more Seedlings of equal merit be shown, the prize shall be awarded to each. The Committee shall in all cases withhold the prize altogether, if they do not deem the fruit worthy.

A Seedling to which one of these annual prizes has been awarded cannot compete a second time in this class, but may compete in the class of Permanent Prizes.

A Seedling Apple which has received one of the money prizes in the class of Permanent Prizes cannot again receive a money reward, but may be offered in competition for the Honorary Medal.

CERTIFICATES OF MERIT.

Seedling fruits which have received any of the foregoing money prizes may be offered in competition for certificates of merit.

The Committee on Seedling Fruits will report to the Directors those fruits which they think to be worthy of a Certificate of Merit. The Directors will then make full inquiry and examination concerning the character of the fruit, including size, appearance and quality, the habit, vigour, health, hardihood and productiveness of the tree or plant, and its general adaptation to the climate of Ontario; and bestow such Certificate, if any, as they may think it worthy to receive.

A fruit which has received a Certificate of Merit may be offered in competition for the Honorary Medal.

The Honorary Medal may be given any number of times to the same person for different fruits, but only once for any one fruit.

CONDITIONS OF COMPETITION.

Seedling fruits offered in competition for these prizes must be shown in quantities of not less than *half a dozen specimens* of each sort, if they be Apples, Pears, Plums or Peaches; if Grapes, not less than *three bunches*; if Berries, not less than *one pint*. Each sort or variety must be accompanied by a statement, signed by the person sending the fruit, setting forth the origin of the tree or plant, if known; if the origin be unknown, then so much of the history of the tree or plant yielding the fruit sent, as may be ascertained—its vigour, hardihood and productiveness, the character of the soil in which it is growing, and what, in the estimation of the sender, are the peculiar excellencies of the fruit. This rule *must be observed in all cases*, whether the fruit be shown at the meetings of the Association or sent to the President for the examination of the Committee.

CONDITIONS OF MEMBERSHIP.

The annual fee is ONE DOLLAR, payable on the first day of January in each year, and may be sent to the Secretary-Treasurer, D. W. Beadle, Esq., St. Catharines.

Any person remitting the fees of old or new members, with their names and post-office address, may retain ten per cent. of the amount for his trouble. This arrangement is in lieu of the extra allowance in trees formerly given for each club of five members.

THE FRUIT-GROWERS' ASSOCIATION OF ONTARIO

seeks to collect, arrange and disseminate information on the subject of Fruit Culture.

These objects are secured in the following manner:—

By holding meetings every year in different localities, of which all members receive notice by circular; by reporting and preserving the discussions; by procuring and publishing valuable essays by skilled fruit-growers; by appointing committees to make personal examination of different sections of the Province, and report upon the peculiar characteristics of the

soil, climate, and special conditions of fruit culture therein ; by illustrating the Annual Report with coloured lithographs, drawn from nature, of the new fruits raised by our Canadian hybridists ; by disseminating among the members trees or plants of some new fruit that promises to be valuable throughout the Province, only exacting that the members will make a report for a few years to the Secretary, as to the manner these succeed with them ; by rewarding essayists, and, as far as practicable, the efforts of our hybridists.

In calling the attention of your neighbours to the advantages and benefits derived from becoming a member of this Association, you will confer a favour on your friends, and receive ten per cent. of the amount you may collect as a recognition of your services.

ROBERT BURNET,
President.

INTERNATIONAL FRUIT EXHIBITIONS.

In 1875, the American Pomological Society will hold its biennial session at Chicago in September.

In 1876, at Philadelphia, will be held, the Grand International Centennial Exhibition.

The success that Ontario achieved at Boston in 1873, surely indicates that we need not hesitate to exhibit a collection of Canadian fruits on both these occasions. Such opportunities of making the world acquainted with the capabilities of our country in fruit-growing, ought not to be neglected, as no better advertisement could be given for the encouragement of emigration.

Not only ought our rulers to be forward in providing the means to defray the expenses incidental to such exhibitions, but also our fruit-growers should, by judicious thinning out and cultivation, make the best preparation.

ANNUAL REPORT
OF THE
ENTOMOLOGICAL SOCIETY
OF ONTARIO,
FOR THE YEAR 1874.

INCLUDING REPORTS ON SOME OF THE NOXIOUS AND BENEFICIAL
INSECTS OF THE PROVINCE OF ONTARIO.

PREPARED FOR THE HONOURABLE THE COMMISSIONER OF AGRICULTURE,
ON BEHALF OF THE SOCIETY.

BY

THE REV. C. J. S. BETHUNE, M.A.,

*Head Master of Trinity College School, Port Hope; President of the Entomological Society of
Ontario;*

WILLIAM SAUNDERS,

Editor of the Entomologist;

EDMUND BAYNES REED,

Vice-President of the Entomological Society of Ontario.

Printed by Order of the Legislative Assembly.



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1875.

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Vice-President of the Entomological Society of Ontario.

REPORT OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO FOR THE
YEAR 1874.

To the Honourable the Commissioner of Agriculture,—

SIR,—I have the honour to submit for your consideration the Report of the Entomological Society of Ontario for the year 1874, embracing a detailed statement of receipts and expenditures during the year, which accounts have been duly audited, also a list of the office-bearers elected for the year 1875.

The annual meeting of the Society was held at the City of Toronto, at the same time as the Exhibition of the Agricultural and Arts Association in accordance with the provisions of the statute, when the various reports were then presented and approved of.

I have also the pleasure of submitting herewith a Report on some of the Noxious, Beneficial and Other Insects of this Province, which has been prepared on behalf of the Society by the Rev. C. J. S. Bethune, M.A., Mr. Wm. Saunders and Mr E. B. Reed.

THE CANADIAN ENTOMOLOGIST, the organ of the Society is still issued monthly, and has now nearly reached the completion of its sixth volume, the regular issue of our journal for the past six years has enabled us with the help of our esteemed contributors to disseminate a vast amount of practical, as well as scientific knowledge relating to Entomology which has done much towards increasing the interest felt in this branch of Natural History so important to the agriculturist.

In order to illustrate the pages of this Report, we have procured as large a number of new wood cuts and electrotypes as the limited means at our disposal would admit of, we can only regret that it is not more profusely illustrated as we feel sure that such illustrations add greatly to the interest and usefulness of our report.

I have the honour to remain, sir,
Your obedient servant,

J. H. McMECHAN,
Secretary-Treasurer Entomological Society of Ontario.

ANNUAL MEETING OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

The fourth annual meeting of the above Society was held (by the kind permission of the Provost) in the library of Trinity College, Toronto, on the 23rd of September, at 3.30, P.M. The report of the Secretary-Treasurer was presented, showing a slight increase of membership and a satisfactory condition of the finances, after which the President read his annual address, which was by request of those present, kindly placed at the disposal of the Printing Committee for publication.

The following Officers were then elected :—

President.—Rev. C. J. S. Bethune, M.A., Port Hope.

Vice-President.—R. V. Rogers, Kingston.

Secretary-Treasurer.—J. H. McMechan, London.

Council.—E. Baynes Reed, W. Saunders, Rev. G. M. Innes, J. M. Denton, London, G. J. Bowles, Montreal.

Editor of Entomologist—W. Saunders.

Editing Committee.—Rev. C. J. S. Bethune, M.A., E. Baynes Reed, J. G. Bowles.

Library Committee.—W. Saunders, E. Baynes Reed, J. H. McMechan.

Auditors.—Chas. Chapman and J. H. Griffiths, London.

FINANCIAL STATEMENT OF THE SECRETARY-TREASURER.

Receipts.

To Balance from previous year.....	\$177 62
“ Government Grant additional for 1873.....	500 00
“ “ “ “ “ 1874.....	750 00
“ Members’ fees	137 52
“ Sales cork, pins, labels, &c.....	195 02
	<hr/>
	1760 16

Disbursements.

By CANADIAN ENTOMOLOGIST, printing.....	518 75
“ Pins, cork, &c.....	91 02
“ Engravings	118 10

By Library	\$58 95
“ Editor's salary for 1872	100 00
“ “ “ “ 1874	100 00
“ Secretary's salary for 1873.....	50 00
“ “ “ “ 1874.....	50 00
“ Expenses, sundry small	120 18
“ Rent	80 00
“ Expenses of Report	51 00
“ Balance, cash in bank	422 16
	<hr/>
	1760 16

We certify the above as a correct statement of accounts for the year ending September 23, 1874, as shown by Treasurer's books and with vouchers for the same.

J. H. GRIFFITHS, }
CHAS. CHAPMAN, } *Auditors.*

REPORT OF THE COUNCIL.

It is gratifying, at the expiration of this the fourth year of the existence of our Society, to be able to report its continued well-being and progress, and to know that its efforts are being more and more recognized as an aid to those agricultural interests which constitute the chief source of the wealth of our Province.

The *Entomologist* is still regularly published, and has now nearly reached the close of its sixth volume. By its regular issue there has been placed before our members much useful and practical information relating to many of the commoner insect pests, with instructions as to the use of the best remedies to check their ravages. Besides this it has formed, and still forms, a valuable medium for the publication of such scientific matter in relation to the life history of our insects, which, while of immediate interest to only a limited number of our readers, is of great importance to those engaged in the study of the science of Entomology. We feel that our journal has done and is still doing a good work in this respect; and it is pleasing to know that our efforts in this direction are warmly appreciated by scientific men in the adjoining Republic and in Europe, as well as in our own country.

As mentioned in the Report of the last Annual Meeting, a cordial invitation was extended by the "American Association for the Advancement of Science," at the meeting held in Portland, in 1873, to the members of our Society to be present at the meeting in 1874, in Hartford. A deputation was appointed by your Council to attend this meeting on behalf of our Society, in reference to which the following report appeared in the September number of the *Entomologist*:—

THE AMERICAN ASSOCIATION.

At the recent gathering of this scientific body in Hartford, Conn., there were brought together an unusual number of Entomologists. This was owing partly, no doubt, to the kind invitation extended by the Association to the American and Canadian Entomological Societies to appoint special meetings of their members to be held at that time and place, with the view of having these important Societies fully represented. In response to this invitation, a number of members of the American Entomological Society were present, while our Canadian Entomologists were represented by the worthy President of our Society, Rev. C. J. S. Bethune, M.A., and the Editor of the *Entomologist*. Several evenings were occupied by these "brethren of the net" in interesting and profitable discussions on the habits and peculiarities of various insects, the time passing so pleasantly that the midnight hours were reached ere separation could be effected. After mature deliberation it was resolved to organize under the name of "The Entomological Club of the A. A. A. S.," and the following constitution was adopted:—

TITLE.

I. The name of the association shall be "The Entomological Club of the American Association for the Advancement of Science."

OBJECTS.

II. The annual re-union of the Entomologists of America, the advancement of entomology, and the consideration of all general questions relating to the science that may from time to time arise.

MEMBERSHIP.

III. All members of the American Association for the Advancement of Science who are interested in entomology, shall *ipse facto* be members of the club.

OFFICERS.

IV. The officers of the club shall be a President, a Vice-President, and a Secretary, to be elected annually by vote of the members.

DUTIES OF THE OFFICERS.

V. The President, or in his absence the Vice-President, shall preside at all meetings; the Secretary shall perform all the usual duties of a recording and corresponding Secretary.

MEETINGS.

VI. A meeting shall be held in each year at the place of meeting appointed by the American Association for the advancement of Science; it shall commence at 2.30 p.m., on the day before the meeting of the American Association for the advancement of Science, and be continued throughout that evening; further meetings may be held as time will permit during the week following.

The following resolutions were also unanimously passed:

Resolved, That the members of the American Entomological Society and the Entomological Society of Ontario, together with all other persons interested in entomological science, be cordially invited to attend and take part in the proceedings.

Resolved, That the Secretary be requested to publish notices of the meeting in such periodicals devoted to natural history, and especially in those devoted to entomology as are published on the continent; and further that the members be requested to bring with them at the annual re-unions specimens for exchange and exhibition, and especially types of species that they may have described during the year.

At a subsequent meeting of the Club, the following officers were elected: President, Dr. John L. Leconte, Philadelphia, Pa.; Vice President, Samuel H. Scudder, Cambridge, Mass.; Secretary, Chas. V. Riley, St. Louis, Mo. We feel sure that under such able direction, the Entomological Club of the A. A. A. S. will prosper, and be the means of stimulating many to increased effort, and thus greatly advance the interests of our favourite study.

As it may interest many to know who were present at these meetings, we furnish the following list: Dr. John L. Leconte, Philadelphia, Pa.; Dr. J. G. Morris, Baltimore, Md.; Prof. S. S. Haldeman, Chickis, Pa.; Dr. H. A. Hagen, Cambridge, Mass.; S. H. Scudder, Cambridge, Mass.; A. R. Grote, Buffalo, N. Y.; Dr. G. M. Levette, Indianapolis, Ind.; C. V. Riley, St. Louis, Mo.; O. S. Westcott, Chicago, Ill.; J. A. Lintner, Albany, N. Y.; H. F. Bassett, Waterbury, Conn.; George Dimmock, Springfield, Mass.; B. Pickman Mann, Cambridge, Mass.; E. P. Austin, Cambridge, Mass.; Dr. R. King, Kalamazoo, Mich.; Chas. P. Dodge, Washington, D. C.; Mr. Patton, Waterbury, Conn.; Rev. C. J. S. Bethune, M. A., Port Hope, Ont.; W. Saunders, London, Ont. During the meetings of the Association several interesting and valuable papers on Entomological subjects were read by Dr. Leconte and Messrs. Scudder, Riley and Grote.

The branches of our Society organized at London, Montreal and Kingston, continue to

thrive, and by their frequent meetings and social intercourse stimulate the members resident in these cities to greater application in the service of entomology. We trust that such of our members as can, will aid the editor of the *ENTOMOLOGIST* by sending him from time to time, memoranda of their observations, on the habits and life history of our insects with any other notes they may deem of interest to the lovers of our favourite science.

Submitted on behalf of the Council by
J. H. McMECHAN,
Secretary-Treasurer.

ANNUAL MEETING OF THE LONDON BRANCH.

The annual meeting of the London Branch of the Entomological Society of Ontario was held at the residence of Mr. W. Saunders, on the 17th of February.

A goodly number of members were present, and the following officers were elected for 1874: President, A. Puddicombe; Vice-President, H. P. Bock; Secretary-Treasurer, J. G. Geddes; Curator, J. Williams; Auditors, Messrs. C. Chapman and J. Griffiths.

A box of Lepidoptera from Miss Carey, of Amherstburg, was shown by Mr. E. B. Reed, containing some interesting specimens taken in that locality; among others there were fine examples of *Papilio thoas* and *Philampelus satellitia*.

W. Saunders exhibited a box of Coleoptera, embracing a large number of species kindly donated by Theodore L. Mead, Esq., of New York. Also, several boxes of European insects, presented by Francis Walker, Esq., of the British Museum. The Secretary was instructed to tender to Mr. Walker the sincere thanks of the Society for his continued liberality in this matter—the cabinets of the Society and those of the members also having been repeatedly enriched with valuable specimens through his kindness.

ANNUAL MEETING OF THE MONTREAL BRANCH.

The first annual meeting of the Montreal Branch of the Entomological Society of Ontario was held on May 6th, 1874, when the following officers were elected for the ensuing year:

W. Couper, President; G. J. Bowles, Vice-President; F. B. Caulfield, Secretary-Treasurer; G. B. Pearson, Curator; Council—W. Hibbins, sen., C. W. Pearson, P. Knetzing.

The reports of the Council and Secretary-Treasurer were read, and, on motion, adopted. The Branch, although young, is in a prosperous condition, the expenses of the past year having been met, leaving a small balance on hand, and the list of members is gradually increasing. Owing to the lateness of the season but little field work has been done, but some rare captures have been made already. The Branch meets as usual at the residence of the President, No. 67, Bonaventure Street, Montreal, P. Q. All business communications to be addressed to the Secretary-Treasurer, F. B. Caulfield, 254, St. Martin Street, Montreal, P. Q.

FIRST ANNUAL REPORT OF THE COUNCIL OF THE MONTREAL BRANCH OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

During the summer of 1873 a fortunate circumstance occurred to which this Branch owes its origin. The following gentlemen, viz., Wm. Couper, F. B. Caulfield, Wm. Hibbins, C. W. Pearson and G. B. Pearson, met by chance on the Montreal Mountain, where the subject was discussed, and it was then decided to hold a meeting at the residence of Mr. Caulfield, in order to make further arrangements for its formation. This meeting was held on the 30th of August, when it was resolved to form a branch in connection with the Entomological Society of Ontario, and the Secretary *pro. tem.* was instructed to write to the parent society, asking permission to form a Branch Society in this city. This proposition was at once accepted by the parent Society.

On the 16th of October the following officers were elected for the ensuing year:—William Couper, President; M. Kollmar, Vice-President; F. B. Caulfield, Secretary-Treasurer; Council—G. J. Bowles, P. Knetzing and C. W. Pearson; Curator, William Hibbins.

By-Laws were framed for the guidance of the Branch, which were approved by the parent Society. Our monthly meetings have been regularly held and well attended, and your Council congratulate the Society on benefits derived. During the eight meetings which have been held, independent of the production of original communications on Entomology, there were remarkably good exhibitions of insects, which also tended to give additional information to members.

The first meeting of the Branch in August, 1873, consisted of seven members, and since then five additional members have been elected.

The following papers were read during the winter months:—

“A Dissertation on Northern Butterflies,” by William Couper; “On the Cicindelidæ Occurring on the Island of Montreal,” by F. B. Caulfield; “On Some of the Benefits Derived from Insects,” by F. B. Caulfield.

The following works have been donated during the year:—

“On Some Remarkable Forms of Animal Life from the Great Deepes of the Norwegian Coast,” by G. O. Sars, 1 Vol.; “On Norwegian Crustaceans,” by G. O. Sars, 2 Vol.; “Synopsis of the Acrididæ of North America,” by Cyrus Thomas, 1 Vol.

Your Council would suggest that the Curator procure store boxes for the preservation of the specimens obtained for the Society during the approaching season. In this way the nucleus of a collection can be formed prior to the purchase of a cabinet, which your Council trusts the Society will be possessed of before next winter.

Your Council would also suggest that members carry note-books wherein to record Entomological observations, especially relative to insects injurious to the crops; also, of such species as are considered beneficial in checking the progress of destructive insects. As this is one of the principal objects of the Society, field notes of this nature are always valuable, and should form subjects of investigation and discussion at our meetings. Attention should be given to the larval forms of insects, as this is a specialty of Entomology from which much knowledge is yet to be obtained.

Your Council strongly impress on the members to use their influence in promoting a knowledge of the importance of the study of Entomology, more especially with Agriculturists and horticulturists, in order to enable them to check the ravages of the numerous insects injurious to vegetation.

All of which is respectfully submitted.

C. W. PEARSON,
GEO. JNO. BOWLES.

Wm. Couper, Chairman.

ANNUAL ADDRESS OF THE PRESIDENT OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO, 1874.

To the Members of the Entomological Society of Ontario:—

GENTLEMEN,—I beg to offer you again, after the lapse of a year, my hearty congratulations upon the continued prosperity of our Society. As you have already learnt from the Report of our Secretary-Treasurer, we have been favoured with a slight increase in our list of membership—as large, indeed, as can fairly be expected in a Society which confines itself to the study of a particular branch of Natural Science, and which cannot therefore attract into its ranks many who are not specially engaged, to some extent at least, in this limited field of investigation.

It is especially pleasing to find that our number of branches continues to increase—a highly successful one, with its headquarters in Montreal, having been organized since our last annual meeting. Its first annual report has been already presented to us in the pages of our journal.

The CANADIAN ENTOMOLOGIST, upon whose success the well-being and fair fame of our Society so largely depends, has—I am sure you will agree with me—been more ably sustained

than ever before. The thanks of the whole Society are assuredly due to the energetic and talented Editor, Mr. Saunders, who has been, indeed, its mainstay from the issue of its first number till now. It would be well if all our members would aid him, not only by contributions, but also by increasing the circulation, and thereby improving the means of support of the publication.

When I applied just now the term "limited" to our field of enquiry, I only did so when considering Entomology as one amongst a large number of sections of the great circle of natural sciences, which includes within its area the study of all things material which come within the range of man's intellectual powers. If we look, however, at Entomology and its objects alone, we cannot fail to see at once that it is practically without limit—that there is work enough for thousands of investigators for almost innumerable generations to come. And when we couple with Entomology other kindred sciences, such as Botany, Geology and Physical Geography, which are so closely allied that no student can safely overlook them, we begin almost to be overwhelmed with the vast extent of this field of knowledge that we seek to explore. So vast, indeed, is the field that no one now ventures to survey the whole of it, except in a very general way; each explorer finds himself compelled—if he would do any effective work—to confine his labour to some one or two of its sections or subsections. By this division of labour, all departments of the Science will by degrees be taken up, and much that is now a '*terra incognita*' will become familiar to the patient explorer.

In our own country—within the bounds of this great Dominion—there is need of many more students and explorers. Even in this Province of Ontario, the headquarters of our Society, where more has been done than in any other part of Canada, there is yet room for a great increase to our band of collectors and investigators. How incomplete, for instance, is even yet our list of Diurnal Lepidoptera, and how many pages are still blank in the life history of some of our commonest butterflies? Our able Editor, my excellent friend, Mr. Saunders, has done much to fill up these blank pages, and his work is everywhere recognized as thorough and authoritative; but yet there remains much more to be done, that we hope our members will before long accomplish. If we turn to Crepuscular and Nocturnal Lepidoptera, we must feel almost appalled at the extent of our ignorance. For those who have the time and the ability, I can think of no more interesting or attractive field of enquiry—none that will sooner or better repay the pains-taking student, whether he looks for fame or pleasure, whether he sighs for fresh fields to conquer, or desires to set his foot where man has not trodden before. In a department where so much remains to be done, we all, I am sure, offer a most cordial welcome to one who has recently cast in his lot among us, and has traversed the broad Atlantic in order to study the Noctuidæ of this country. I allude to Mr. George Norman, of St. Catharines, late of Forres, in Scotland.

In another order of insects, the Coleoptera, much, no doubt, has been accomplished. Through the pains-taking labours of a Billings and a Pettit, not to mention other good workers, and by the aid of the great authorities in the neighbouring States, Dr. Leconte and Dr. Horn in particular, we have been able to increase our list of Canadian beetles from a few hundreds at the birth of the Society, to more than as many thousands now. But still how very much more remains to be done? What a field of labour there is before both student and collector in the Carabidæ, the Staphylinidæ, the Curculionidæ and other numerous families of beetles! May we not hope that during the coming winter our present scattered stores of knowledge will be utilized and made available for the good of all, by the compilation and publication of a large addition to our old and valuable list of Canadian Coleoptera?

If there remains so much to be done in these two favourite orders, what shall I say of the remainder, that are so generally neglected? It is surely time that some of our members should devote themselves to the working up of such interesting orders as the Neuroptera, the Hymenoptera, the Orthoptera, the Hemiptera, even if no one can be found at present to take up the study of the more difficult Diptera.

In all these orders there is the nucleus of a collection in the cabinets of our Society, while no doubt much additional material would be furnished by individuals to any member who will take up in earnest the study of any one of them. It would be a great contribution to our knowledge of Canadian insects if there could be published by the Society carefully prepared lists of as many species as possible in each of these orders. Such lists would, of course, be very incomplete at first, but they could easily be so arranged in publication that additions might be made to them at any time, as our stores of knowledge increase.

Such, gentlemen, are some of the modes in which, I think, we should endeavour to extend the operations of our Society. If each year, when we assemble together for our annual meeting, we can point to some such work done in the previous twelvemonth, we shall have good reason to congratulate ourselves upon real permanent progress—upon building up the foundation of an Entomological structure that will prove enduring and substantial in time to come.

Thus far I have referred to Entomology as a purely scientific pursuit; there is another aspect in which we cannot refrain from regarding it, viz., as a subject of very great economic importance to every inhabitant of our land. This view of Entomology has been especially brought before us of late by the havoc that has been produced in our farms and gardens by hordes of destructive insects.

The dreaded Colorado Potato Beetle (*Doryphora decem-lineata*) has spread eastward with great rapidity, and has now reached the Atlantic coast in some parts of the United States. I have been informed by friends who reside in various parts of the Union, that while little, if any, diminution in the numbers of the pest is to be observed in the west, it is becoming very destructive where it has attained to its second year of colonization. During the first year of its invasion of a particular locality, no appreciable damage is done by it, but as its armies increase in geometrical progression, the potato crops of the following season generally suffer to a terrible extent. It has now covered the whole of the Province of Ontario, and is very destructive throughout the western half of it, though we are happy to say that our intelligent farmers and gardeners are effectually using the remedies suggested by our colleagues, Messrs. Saunders and Reed, in their Report to the Legislature a few years ago. In Quebec it is but beginning to be observed; no doubt it will be found there in myriads next year. Across the border, it has penetrated to the western portion of Vermont, into New Jersey, down to the sea coast in Pennsylvania, and in Maryland; at Baltimore, Md., it is very abundant, while straggling outposts have been found as far south as Washington. The whole of New York and Ohio have been pretty well covered with the insect, while in Missouri it is as abundant as ever. In Indiana and Michigan there is a local diminution in the numbers of the pest, but no where are there as yet any signs of its cessation. The people of Europe are now beginning—and with good reason—to feel alarmed at the prospect of its crossing the Atlantic. The English and French scientific and agricultural publications are commencing to publish notices of the insect and to talk of restrictive measures, while in Germany, we are told that stringent regulations will probably soon be put in force by the Government to prevent the invasion of the country. Unless some regulations of this kind are put in general force throughout the whole of Western Europe, I believe that—judging from the spread of noxious European insects on this side of the Atlantic—the Colorado Beetle will soon become there as familiar an object and as destructive a pest as it is here.

While the Colorado Beetle from the Rocky Mountains has been overspreading the whole northern continent eastward, there has been moving southward and westward in a similar manner another insect—the Cabbage Butterfly (*Pieris rapae*)—that is almost as injurious as the other. This insect, an European importation, as of course you all know, starting from Quebec some few years ago—there first noticed by our friends Messrs. Couper and Bowles has now spread westward over almost the whole of Ontario. At Port Hope it has been this year by far the most common of all butterflies; thousands were to be seen throughout the whole season, from early summer to the present time, flitting about along every road, and hundreds hovering over or alighting in every garden. There is hardly a cabbage or cauliflower fit to be eaten anywhere in the neighbourhood, while stocks and mignonette have been ruthlessly demolished in all the flower gardens. Its spread westward, however, has hardly been as rapid as its movements to the south. The two maritime provinces of New Brunswick and Nova Scotia, and all the New England States, have for some time been occupied, and now I am told that this year it is most plentiful as far south as Washington, and that it is by no means rare in Virginia.

While referring to the wonderful spread of noxious insects during the past few years, and to their excessive prevalence now, I must not omit to mention the affliction caused to our north-west Province of Manitoba and to many of the western States by the swarms of locusts, or grasshoppers as they are termed (*Caloptenus spretus*). The accounts of the sufferings caused by this terrible plague are perfectly appalling, and rival anything that we have read of the ravages of the Eastern locusts. Happily for us they do not seem to extend

much further to the east than the Missouri River, though, occasionally they penetrate to some of the broad prairies beyond. As a detailed account of this insect will probably be afforded you in the forthcoming Annual Report of our Society, I need not detain you with any further remarks upon it.

The only other insect to which I need now call your attention for a moment, is the Grape Vine *Phylloxera*. I am glad to learn that its ravages in the vineyards to the south of us have been comparatively trifling this year, and that in all probability the summer droughts to which we are so liable, will prevent its ever being as formidable a foe as it was at one time apprehended.

To turn from this not very cheerful subject, I may mention, before concluding, that Mr. Saunders and myself duly attended the recent meeting at Hartford, Conn., of the American Association for the Advancement of Science. There we had the pleasure of meeting a large number of Entomologists from all parts of the United States, and we had the further gratification also, of being presided over, in general session, by the ablest of American Entomologists, Dr. Leconte, and in the Zoological Section, by another great worker in our department, Mr. S. H. Scudder. Informal meetings of Entomologists were frequently held, and finally it was agreed upon to form an Entomological Club of members of the A.A.A.S., who should assemble annually a day before the meeting of the Association in the place that may be from time to time selected for its sessions. In this way we trust that much may be done for the furtherance of our favourite branch of science, and that Entomologists generally, from all parts of the continent, will bring together their types of new species and the surplus of their collections for mutual information and benefit.

Without further trespassing upon your time and attention, I beg to thank you, gentlemen, for the kind consideration you have shown to my colleagues and myself during our term of office, and with hearty wishes for the continued prosperity of our Society,

I have the honour to be, gentlemen,

Your obedient servant,

CHARLES J. S. BETHUNE,

President E. S. of O.

Trinity College School,

Port Hope, September 22nd, 1874.

INTRODUCTORY.

ONCE again at the close of another year, a few of the members of the Entomological Society of Ontario have undertaken the task of endeavouring to lay before the public, some information respecting the habits and lives of the insect world, and more especially those members of it which have a direct or indirect influence upon the growth or well-being of the produce of field or forest.

It is a satisfaction to know that these annual reports are read and appreciated, and that many of our practical Fruit-Growers and Agriculturists are desirous of obtaining some knowledge of the transformations of the various and beautiful members of the insect world, of those beautiful atoms of God's creation, each in its appointed sphere fulfilling the purpose for which it was created, drawing forth our wonder, our admiration and our praise ; for "He who wondereth at nothing hath no capabilities of bliss, but he that scrutinizeth trifles hath a store of pleasure to his hand, and happy and wise is the man to whose mind a trifle existeth not."

"He prayeth best who loveth best
All things both great and small,
For the dear God that loveth us,
He made and loveth all."

ENTOMOLOGICAL CONTRIBUTIONS.

By E. B. REED, LONDON, ONT.

1. THE IO MOTH (*Saturnia Io*).
2. THE FLAT-HEADED APPLE-TREE BORER (*Chrysobothris femorata*).
3. THE LOCUST TREE BORER (*Clytus pictus*).

1. THE IO MOTH *Saturnia* (*Hyperchiria*) *Io*. [Fabr].

Order, LEPIDOPTERA ; Family, BOMBYCIDÆ.

This lovely moth is well worthy a place in the cabinet of the collector, and from its brilliant colouring and conspicuous markings is always sure to attract notice and admiration.

The moth belongs to a family which has received the name of "BOMBYCES" from *Bombyx* the ancient name of the silk worm. As, however, it is in the larval or Caterpillar state that this insect more frequently meets our eye, we will begin by a description of it in that stage. The full grown larva of which, fig. 1 is

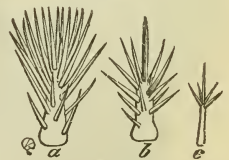
FIG. 1.

an admirable representation, is of a most delicate apple or pea-green colour with a broad dusky white stripe at each side bordered with lilac on the lower edge. The body is covered with spreading clusters of green bristles tipped with black. These bristles are exceedingly sharp, and when the insect is handled will produce a very irritating sting similar to but much sharper than that of the nettle, and the effect of which causes a reddening of the flesh and the immediate appearance of raised white blotches which last for a considerable time. Fig. No. 2 shews the appearance of these



FIG.

bristles, some of them as *b*, being stouter and more acute than the others and able to inflict a sharper and more penetrating sting. This stinging property is very curious and is not very easily explained ; Mr. C. V. Riley writing of a very similar insect, the *Saturnia Maia*, says, " that the sting is caused by the prick of the spines, and not by their getting broken in the flesh. From the fact that the spines appear hollow, one would naturally attribute their irritating power to some poisonous fluid which they eject into the puncture. But I have been unable to resolve any apical aperture, nor was Mr. Lintner more successful. Hence I infer that the irritating property belongs to the substance of which the spines are formed, and this opinion is strengthened by the fact that those of a dead larva, or of a cast-off skin which has been in my cabinet for several years, still retain the irritating power, though so brittle that it is not easy to insert them."



In the earlier stages the caterpillars are gregarious, feeding together side by side and in going to and returning from their place of shelter, moving in regular files after the manner of the processionary caterpillars of Europe (*Cneocampa processionea*). This marching habit is so very peculiar that it is well worth describing. Though the insects move without beat of drum they maintain as much regularity in their steps as a file of soldiers. The celebrated naturalist Reaumur, writing of the European Procession Moth says, "I kept some for a little

time in my house in the country, I brought an oak branch which was covered with them into my study, where I could much better follow the order and regularity of their march than I could have done in the woods. I was very much amused and pleased at watching them for many days. I hung the branch on which I had brought them against one of my window shutters. When the leaves were dried up, when they had become too hard for the jaws of the caterpillars, they tried to go and seek better food elsewhere. One set himself in motion, a second followed at his tail, a third followed this one, and so one. They began to defile and march up the shutter, but being so near to each other that the head of the second touched the tail of the first. The single file was throughout continuous; it formed a perfect string of caterpillars of about two feet in length, after which the line was doubled. Then two caterpillars marched abreast, but as near the one which preceded them, as those who were marching in single file were to each other. After a few rows of our processionists who were two abreast, came the rows of three abreast; after a few of these came those who were four abreast; then there were those of five, others of six, others of seven and others of eight caterpillars. This troop so well marshalled was led by the first. Did it halt, all the others halted; did it begin again to march, all the others set themselves in motion and followed it with the greatest precision. That which went on in my study goes on every day in the woods where these caterpillars live. When it is near sunset you may see coming out of any of their nests by the opening which is at its top, which would hardly afford space for two to come out abreast, one caterpillar, as soon as it has emerged from the nest, it is followed by many others in single file; when it has got about two feet from the nest, it makes a pause during which those who are still in the nest continue to come out; they fall into their ranks, the battalion is formed; at last the leader sets off marching again, and all the others follow him. That which goes on in this nest passes in all the neighbouring nests; all are evacuated at the same time."

According to "Harris," the caterpillars of the Io Moth do not spin a common web, but when not eating they creep under a leaf where they cluster side by side. When about half grown the caterpillars disperse, each seeking a location for itself. They moult five times, the larvae devouring their cast off spinous skins. After being in the larval state about eight weeks, they arrive at maturity, and are then about two and a half inches long, and present the appearance of Fig. No. 1.

Their food plants are very numerous. They have been found on Black Locust, Indian Corn, Willows, Sassafras, Wild Cherry, Elm, Hop Vine, Balsam, Balm of Gilead, Dogwood, Choke Cherry, Currant, Cotton and Clover. I this year found two larvae on the English Filbert, and bred them to maturity on that plant. I have, however, more commonly found them on the Choke Cherry. The larvae when full grown ceases eating, and crawls to the ground, where, amongst the loose leaves and rubbish, it forms a rough outer covering, within which it makes a slight cocoon of tough, gummy, brown silk. In this retreat a transformation is soon effected to the pupal or chrysalis state, from which, having remained therein during the winter and spring months, the moth emerges in the perfect winged condition about the month of June.

The moths are remarkable for the difference between the sexes both in size and colour.

Fig. 3.



The male (Fig. 3), which is much the smallest, is of a deep Indian or maize yellow colour.

On the forewings are two oblique, wavy lines near the hind margin and a zig-zag line near the base. There is also a large, dark, reddish, central reniform spot or blotch; this is very marked in all the Canadian specimens I have seen, although in the cut, which is drawn by Mr. Riley, probably from a specimen taken in the Western States, the spot is not so distinct. The hind wings are broadly shaded with purple

next to the body; near the hinder margin is a curved purplish band, and within this again is a smaller one of a dark purple or violet colour. In the centre of this last band and the middle of the wing is a large round blue spot, with a whitish centre and a broad border, almost black. It is from these prominent eye-spots that the moth derives its name, in allusion to

the classical Grecian fable of the beautiful Io who, having incurred the displeasure of the jealous Juno, was placed by her under the watchful vigilance of the hundred-eyed Argus.

The under side of the wings is of the same deep yellow—the forewings having the inner margin broadly shaded with purple and shewing the reniform eyed spot very distinctly; the hinder wings are more uniform in colour, with a transverse purple line, and a very small distinct white spot representing the centre of the large spot on the upper side. The body is also deep yellow—somewhat darker on the thorax. The antennæ, as usual in the males of the bombyces, are beautifully pectinated, presenting a double comb-like appearance. The male varies slightly in size, from two and a half to two and three-quarter inches in width.

Fig. 4.



The female (Fig. No. 4) is considerably larger, ranging from three to three and a half inches. The specimens vary much in colour, from a dark purplish brown to a warm ochreous red. The fore wings have similar wavy zig-zag lines, the reniform blotch being less distinct than that in the male; the inner margin is of a deeper colour, and with the head and thorax is thickly coated with a short, woolly, pilose covering. The

hind wings are marked in a similar manner to those of the male. The undersides of the wings have the same uniform colour, and are marked much like those of the male.

The body is ochreous yellow, a little lighter above, and each segment is bordered with a narrow, reddish band.

“The moths have a fashion of sitting with their wings closed, and covering the body like a low roof, the front edge of the underwings extending a little beyond that of the upper wings and curving upwards.”

The eggs are deposited on the under side of the leaf, and are described by Mr. Riley as being compressed on both sides and flattened at the apex, the attached end smallest. Their colour is cream white with a small black spot on the apical end and a larger orange one on the sides. A cluster found on Sassafras by a western lady contained about thirty eggs. The moths are nocturnal, flying only by night.

THE FLAT-HEADED APPLE-TREE BORER.

Chrysobothris femorata, (Fabr.)

Order, COLEOPTERA; Family, BUPRESTIDÆ

Among apple-growers there has been during the past year or two a great complaint of some borer infesting their trees, and investigation has shown that it is to this little beetle that the injuries may be traced.

Fig. 5.



Although insignificant in size, yet its larva is capable of doing immense mischief in our orchards. The beetle belongs to a family of insects which is especially remarkable for their rich and varied colouring, many having most brilliant tints. The one we are describing, fig. 5, is of a greenish brassy black colour above, the under side having a bright coppery hue. It is about half an inch in length. It is of an oblong oval shape, blunt round head, and tapering towards the tail. It flies by day and is very swift on the wing. It may often be seen during the summer months running up and down the trunk and limbs of trees or resting itself, basking in the sunshine.

The larva, fig. 6., is a pale yellow, footless grub, its anterior end being enormously enlarged, round and flattened. Dr. Fitch worked up the history of this little pest some years ago. According to his account “the parent beetle deposits its egg on the bark from which a worm hatches and passes through the bark, and during the earlier stages of

its life, consumes the soft sap wood immediately under the bark. But when the worm approaches maturity and has become stronger and more robust, it gnaws into the more solid heart-wood, forming a flattish and not a cylindrical hole such as is formed by most other borers, the burrow which it excavates being twice as broad as it is high, the height measuring the tenth of an inch or slightly over. Within this hole the larva may be almost always found with its tail curled round completely towards the head, in a manner peculiar to the larvæ of beetles belonging to the family *Buprestidae*. It remains in the tree about a year. It is in the latter end of the summer, that the larva penetrates into the hardwood of the tree; its burrow extending upwards from the spot under the bark where it had previously entered. On laying open one of the burrows Dr. Fitch found it more than an inch in length, and all its lower part filled and blocked up with the fine sawdust like castings of the larva. With regard to remedies, Dr. Fitch advises three: "First, coating or impregnating the bark with some substance, repulsive to the insect. Second, destroying the beetle by hand-picking; and Third, destroying the larva by cutting into and extracting it from its burrow."



His advice is so plain and comprehensive than I cannot do better than quote it at length. "As it is during the month of June and forepart of July that the beetle frequents the trees for the purpose of depositing its eggs in the bark, it is probable that whitewashing the trunk and large limbs, or rubbing them over with soft soap early in June, will secure them from molestation from this enemy. And in districts where this borer is known to infest the apple trees the trees should be repeatedly inspected during this part of the year, and any of these beetles, that are found upon them should be captured and destroyed. It is at mid-day of warm sunshiny days that the search for them will be most successful, as they are then most active, and shew themselves abroad. The larvæ, when young, appear to have the same habit with most other borers, of keeping their burrow clean by throwing their castings out of it through a small orifice in the bark. They can therefore be discovered, probably, by the new, sawdust like powder, which will be found adhering to the outer surface of the bark. In August or September, whilst the worms are yet young, and before they have penetrated the heart-wood, the trees should be carefully examined for these worms. Whenever, from any particles of the sawdust-like powder appearing externally upon the bark, one of these worms is suspected, it will be easy, at least in young trees, where the bark is thin and smooth, to ascertain by puncturing it with a stiff pin, whether there is any hollow cavity beneath, and if one is discovered, the bark should be cut away with a knife until the worm is found and destroyed. After it has penetrated the solid wood, it ceases to eject its castings and consequently, we are then left without any clue by which to discover it. Hence the importance of searching for it seasonably."

The natural food of this insect is believed to be the white oak, but it is found also on many other trees, such as apple, peach and plum, and, according to Mr. C. V. Riley has most seriously affected the soft maples in the valley of the Mississippi. The beetle when caught contracts all its limbs and feigns death.

THE LOCUST-TREE BORER. [*Clytus Pictus*.—FABR.]

Order, COLEOPTERA ; Family, CERAMBYCIDÆ.

This active little beetle belongs to the same family as the *Clytus Speciosus*, of Say, whose attacks on the maple tree I described in my report for 1872.

This is a very common insect, and a most fatal obstacle to the cultivation of the locust tree in Ontario.

In 1866, at the meeting of the Entomological Society of Canada, Prof. Croft, of Toronto, drew the attention of the members to the ravages during the past summer, of this beetle, and stated that many of the acacia trees of Toronto and the vicinity, had fallen victims to the larvæ. Since that date the writer has watched with interest the steady westward progress of this destructive pest. Indeed, so rapid has been its spread, that there is hardly a locality in Ontario now, where it has not made its appearance, and we may almost give up any attempt to check its ravages, or to successfully procure the cultivation of the locust tree.

These beetles are so common now that they will be readily recognized without any engraving. They are from three quarters to half an inch in length. Colour, velvet black,

with transverse lemon-yellow bands, of which there are three on the head, four on the thorax and six on the elytra or wing covers, making thirteen in all; the tips of the elytra are also edged with yellow. The third band on the body is very noticeable, as it forms a very distinct representation of the letter W. The thorax is very globular. The antennae are dark brown. The underside of the body has the outer edges of the segments, bordered with yellow stripes. The legs are rust-red.

"In the month of September," writes Dr. Harris, "these beetles gather on the locust trees, where they may be seen glittering in the sunbeams, with their gorgeous livery of black velvet and gold, coursing up and down the trunks in pursuit of their mates, or to drive away their rivals, and stopping every now and then to salute those they meet with a rapid bowing of the shoulders, accompanied by a creaking sound, indicative of recognition or defiance. Having paired, the female, attended by her partner, creeps over the bark, searching the crevices with her antennae, and dropping therein her snow-white eggs, in clusters of seven or eight together, and at intervals of five or six minutes, until her whole stock is safely stored. The eggs are soon hatched, and the grubs immediately burrow into the bark, devouring the soft inner substance that suffices for their nourishment till the approach of winter. During winter they remain at rest in a torpid state. In the spring they bore through the sap-wood, more or less deeply into the trunk, the general course of their winding and irregular passages being in an upward direction from the place of their entrance. For a time they cast their chips out of their holes as fast as they are made, but after a while the passage becomes clogged, and the burrow more or less filled with the coarse and fibrous fragments of wood, to get rid of which the grubs are often obliged to open new holes through the bark. The seat of their operations is known by the oozing of the sap, and the dropping of the sawdust from the holes. The bark around the part attacked begins to swell, and in a few years the trunks and limbs will become disfigured and weakened by large porous tumours caused by the efforts of the trees to repair the injuries they have suffered." The habits of this insect seem to have been known for a long time, for we find a description of them made in 1771, by Dr. J. R. Forster, and Dr. Fitch records that Petivera gave a figure and description of it in his "*Gazophylacium*," published in London in 1702.

The beetle is, undoubtedly, a native species, it never having been found in any other country. In remarking on their destructive powers, Dr. Fitch states, "that one of the principal thoroughfares leading east from the city of Utica was formerly planted on its south side with locust trees, these had become so large and ornamental as to render this one of the most admired avenues in the suburbs of that city. When some thirty (now 40), years since, these trees were invaded by this insect, to such an extent, that in the course of two or three seasons, they were totally ruined, many of them being killed outright, and the remainder having their limbs and branches so lopped off, that they could never recover from the deformity." Michaux also reported that fifty years ago this insect had become so destructive, that many people in different parts of the States were discouraged from planting the locust.

In my own experience, three or four seasons have completely killed the largest trees, and about half that time for many of those of smaller size. The numbers and fecundity of the beetle are very great. I well remember in the early fall of 1873, on passing a small clump of locusts growing in St. Paul's Churchyard, London, Ont., my attention being arrested by the breaking off of a branch of considerable size from one of these trees, and my curiosity being excited, I made an examination, and found that the branch had been eaten almost through by the larvæ, and on looking up at the trunk of the tree, I counted over fifty beetles running up and down; that tree was completely killed that season. I had occasion to pass these trees going up and down to my office, and I am satisfied I must have killed fully one hundred that year, merely treading on them as I found them on the sidewalk beneath, or in the neighbourhood of these trees.

These beetles may often be found feeding on the pollen of the Golden Rod (*Solidago*). Dr. Fitch suggests, "as a feasible plan of checking the multiplication and destructiveness of these borers, to plant a small patch of the Golden Rod where locust trees are grown, that the beetles when they issue from the tree may resort to the flowers as is their habit. They can readily be found thereon, and captured and destroyed. It will be a pastime to the children of the household, whose sharp eyes qualify them well for this employment, to search their flowers."

The gathering should be begun as soon as the beetles begin to appear, and should be

continued for several successive seasons ; if none of the Golden Rod can be conveniently grown, numbers of the beetles may still be caught while pairing on the trunk of the trees ; if too high to reach, a sharp rap against the tree will cause them to drop to the ground. when with a little activity they can be secured.

The grub remains in the tree about a year ; the beetle when handled, makes a peculiar sharp creaking noise.

NOTES OF THE PAST SEASON.

By W. SAUNDERS.

THE CURRANT WORM (*Nematus ventricosus*, KLUG).

This troublesome pest has been in most localities as abundant as ever during the past summer. Whatever checks nature may have provided to prevent its excessive increase, they seem, as yet, to avail but little, for the larvæ continue to swarm in hundreds and thousands on currant and gooseberry bushes throughout the summer, demanding constant vigilance and liberal supplies of hellebore if the foliage is to be preserved.

For the benefit of those who may not possess copies of our previous reports we have introduced again figures of this insect with such additional notes on this species in its various stages as we have been able to gather during the summer.

FIG. 7.



Fig. 7 shows the eggs as they are laid on the under side of the leaves. These eggs (described from specimens found on the 28th June) are when first laid about $\frac{3\frac{1}{10}}{100}$ ths of an inch long, nearly cylindrical, rounded at the ends, white, glossy and semi-transparent. Eggs found on the same bushes, the same day, but probably laid some days before, measured $\frac{4\frac{1}{10}}{100}$ ths of an inch in length with a corresponding increase in diameter. From this it is reasonable to infer that the eggs increase in size before hatching, the elastic membrane which forms their covering expanding with the development of the enclosed larvæ. The eggs, of which we have examined large numbers, we have never found embedded in the substance of the leaf (as some have stated they are) to any perceptible extent; careful examination under a powerful microscope has failed to reveal any abrasion of the surface after the egg has been forcibly removed.

FIG. 8.

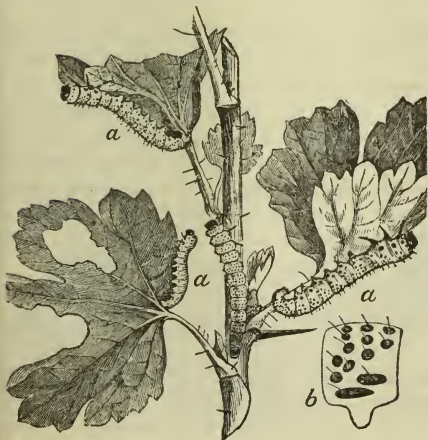


Fig. 8 represents the larvæ nearly full grown, and Fig. 9 the perfect insects, the smaller one being the male, the larger one the female.

On the 19th of June, on going into the garden about 7 A.M., we noticed these perfect insects flying about in scores in sunny spots, around and under gooseberry bushes; in about an hour afterwards when visiting the same spot for the purpose of capturing some, only one here and there could be found, and these had settled on the bushes. A male and female were captured and enclosed in a gauze bag, which was tied so as to enclose a small branch of a gooseberry bush, with several leaves on it, all quite free from eggs. When examined in the evening of the same day, the female was seen laying her eggs; the next morning, on opening the bag, it was found that 48 eggs had been deposited during the interval, the female being still very active. On the

24th of June, this branch was examined again, when quite a number of the young larvæ were found just hatched from the eggs which had then only been laid between four and five days; many of the eggs, however, were found dried up, for which no cause could be discovered.

FIG. 9.

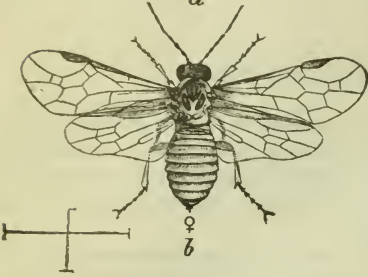
♂
α♀
β

FIG. 10.



a

b

FIG. 11.



On the 30th of June, the larvæ of a lace wing fly *Chrysopa* was observed sucking the juices from the young larvæ of *N. ventricosus*. This friendly helper was a little more than a quarter of an inch long, and had placed itself in the midst of a colony of the young currant worms and had already consumed several before it was taken in the act, Fig. 10 b represents one of their larvæ about half-grown, the fly is shown in Fig. 11. The female lace wing fly lays her eggs on long slender stalks, fig. 10 a, placing quite a group of them together; they are very pretty objects. It is supposed that these long stalks serve the purpose of keeping the unhatched eggs at a safe distance from the young larvæ first hatched who would, otherwise, probably eat them up. The perfect insect deposits these eggs quite rapidly. On the 18th of June, when out collecting with some friends, one of them captured a lace

wing fly and shut it up in a small box. In a few moments after, having occasion to look at it, he found one egg deposited; after walking a few yards with it to show it to us, which could not have occupied him more than three or four minutes, the box was opened again when it was found that three more eggs had been deposited, we had no opportunity of watching the farther deposition or maturing of these eggs. The lace wing fly larvæ are very voracious, and if sufficiently numerous would prove formidable foes to the currant worm.

From about the 12th of May to the end of the season, the currant worms were very abundant. The earlier broods seem to confine their operations almost entirely to the gooseberry bushes, but after two or three weeks they attack the currant bushes with equal vigour. On the 16th of June, we noted the fact that the full grown larvæ in great numbers, others half grown or more and young colonies of the newly hatched larvæ were all to be found at

that date on the same bushes. About the last of July, many colonies of these newly hatched larvæ were found almost entirely destroyed by some undiscovered foe; probably some beneficial insect. Many leaves were found with the rows of empty egg shells on them and with a few holes eaten in them, but with the greater part of their substance uninjured, and with but little or no injury to the leaves surrounding; here evidently the greater portion of the larvæ had been destroyed soon after hatching.

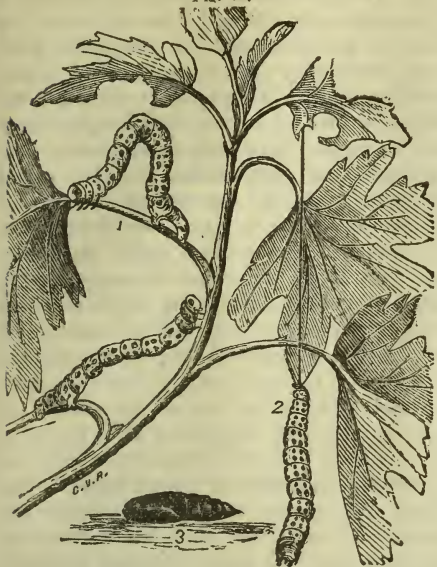
On the 10th of July, while emptying out a number of the perfect flies from a box, searching for the empty pupa case of an ichneumon fly found dead in the box, two pupæ of *ventricosus* were found. They were very pretty objects, about one quarter of an inch long, of a very pale and delicate whitish green colour, becoming yellowish green at each extremity; remarkably transparent and delicate looking. The eyes were black and prominent; the feet, antennæ and mouth parts all separately cased, with the same glossy transparent covering almost crystal-like. The wing cases were similar in appearance, but of a little deeper green, bent under and reaching to the first abdominal segment. The pupa seems to be incapable of movement, a slight quivering only of the limbs could be detected under the microscope when pressed on. The feet all terminated in rounded knobs with no visible claws.

THE CURRANT MEASURING WORM *Ellopia (Abraxis), ribearia*, FITCH.

This insect has also been very abundant during the past summer. As early as the third week in May, the young larvæ were found quite common on red currant, gooseberry and black currant, and by the first of June many of them had grown to an inch in length; judg-

ing from the numbers infesting the bushes, they appeared to prefer the black currant to either the red or the gooseberry. By the 15th of the month they were well grown, and ap-

Fig. 12.



peared as shown in fig. 12, (after Riley). They are then nearly an inch and a quarter long, of a whitish colour with a number of black spots on each ring or segment; a wide yellow stripe down the back, and another of the same character along each side, the latter somewhat broken. The underside is white with a slight tinge of pink, also spotted with black, and with a wide yellow stripe down the middle.

The length of the chrysalis see fig. 12, is about half an inch; it is of a dark reddish brown colour, paler between the segments, appearing under a magnifying glass roughened with minute punctures and irregularities of surface; the abdominal segments are dotted with round punctures of varying sizes, while the terminal one is armed with two short sharp brown spines. By the 2nd or 3rd of July, fresh specimens of the moth fig. 13, were on the wing becoming much more abundant about the 6th, when they were observed flying in almost every direction about the bushes. The moth when its wings are expanded measures an inch or more across; the wings are of a pale yellowish colour with several dusky spots, varying in size and form,

Fig. 13.



and more distinct in some specimens than in others; sometimes these spots are so arranged as to form one or two irregular bands across the wings. About the middle of July, some of these active specimens were captured, and one of the females, confined in a box by itself, laid a large number of eggs, 140 in all, between the 22nd and 23rd of July. These were laid loose in the box excepting 24 of them which were slightly attached to the sides. The egg when viewed through a microscope is a very beautiful object; its length

is nearly $\frac{3}{100}$ ths of an inch, width nearly $\frac{2}{100}$ ths; in form it is an elongated oval, rather blunt at each end. Colour dull yellowish grey, sometimes with a bluish tinge with the surface honeycombed with regular depressions, the ridges bordering each cell having several bright minute whitish dots, which give the egg a very pretty and brilliant appearance when brought under the strong light of the condenser of the microscope. At the present date, December 1st, these eggs are still unchanged, excepting slightly in colour, owing to the developing larvæ showing through the semi-transparent shell in spots, the larvæ in all probability will not emerge until early spring. As there is only one brood of this insect with us during the year, it is never likely to prove very troublesome; a seasonable application of hellebore will in any case keep it within bounds.

THE WHITE-MARKED TUSsock CATERPILLAR, *Orgyia leucostigma*.

The *orgyia* caterpillar is always common in our section of Ontario. The clusters of eggs from which the larvæ are produced are quite numerous in winter on our fruit trees especially those of the apple, pear and plum, they are securely fastened to the tree along with a dead leaf or two by threads of silk.

Fig. 14.

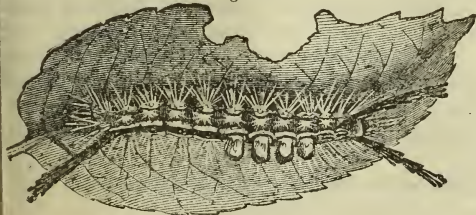


Fig. 14, (after Riley), represents the full-grown caterpillar which, when about to change to a chrysalis, selects a leaf on which to undergo this important transformation, and this leaf in such a position that while the chrysalis is firmly attached to it on the one side, it is firmly secured by silken threads to the under side of a branch on the other, thus securing the leaf from falling to the ground in the Au

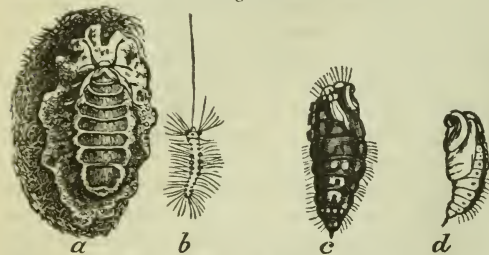
tumn. In about a fortnight after the change to chrysalis takes place, the moths begin to make their appearance. The male which comes forth from a chrysalis not more than about half the size of that which produces the female, (d fig. 16 shows the chrysalis of the male, c

Fig. 15.



that of the female), is a very pretty winged moth, see fig. 15, (after Riley). Its antennae are beautifully feathered or pectinate, and its wings are dark brown, with a white spot on each front wing near the inner hind angle. When at rest its outline is heart-shaped, and its long front feet heavily clothed with hairs and scales are thrust forward to their full length. Very different indeed in appearance is his mate; the female is wingless or furnished with but the merest rudiments of wings which no one would observe without the closest inspection, she is represented at fig 16 resting on the cocoon from which she rarely moves more than a few inches. There she waits the attendance of the male after which the process of egg depositing begins. Dr. Fitch says that the eggs are ex-

Fig. 16.



Colours Yellow and Black.

truded in a continuous string which is folded and matted together so as to form an irregular mass which is glued to the top of the cocoon; on removing this mass of eggs from its place of attachment, the surface of the cocoon appears covered with fragments of a transparent gelatinous-looking substance, which has evidently been applied in a fluid state. The bottom layer of eggs will usually number one hundred or more, and their interstices are well filled with this same gelatinous material, which adheres so strongly to the eggs that when the nest is torn open, they cannot be separated without bringing away portions of this substance firmly attached. Another irregular layer of eggs is placed on this, then a third, and sometimes a fourth before the total number is exhausted, and through the whole of these the gelatinous matter is so placed as to secure every egg, not by its being imbedded in a solid mass, but surrounded by the material worked into a spongy or frothy state. Over all is a heavy layer of the same, with a nearly smooth greyish white surface, the whole number of eggs being so placed as to present a convex surface to the weather which effectually prevents the lodgment of any water on it.

Within this enclosure from 375 to 500 eggs are securely placed. We have counted the contents of several and 375 is the lowest and 500 the highest number we have found. The egg is nearly globular, flattened at the upper side, not perceptibly hollowed, with a dark point on the centre of the flattened portion surrounded by a dusky halo. Its surface is smooth under a magnifying power of 45 diameters, but when submitted to a higher power, appears lightly punctured with minute dots. Its colour is uniformly white to the unaided vision, but the microscope reveals a ring of dusky yellow surrounding it immediately below the flattened portion. Its diameter is $\frac{1}{25}$ of an inch.

A careless observer seeing a dead leaf here and there upon his trees might readily conceive that they were blown into the position they occupied by accident, and retained there by threads of spiders' webs or something of that sort, but a closer examination will furnish food for thought, in the wise arrangements made by the parent moth, in providing for the safety of her future offspring, and at the same time may well excite alarm in the mind of the fruit grower when he perceives promise of the approaching birth of such a horde of hungry caterpillars as even one of these egg masses will produce.

Early in June these eggs begin to hatch and continue to hatch on different trees for several weeks. During the past season we found the larvæ about half an inch long on the 3rd of July, and by the 22nd, some specimens were nearly full grown. There must, however, have been earlier larvæ than these which escaped notice, for on the 29th of July we found a freshly hatched cluster of young larvæ belonging to the second brood. The cocoon had been made and the eggs laid between two young green leaves of a pear tree, the following description was taken the day after.

Length one eighth of an inch. Head, reddish brown slightly bilobed, dotted with black on the sides. Body above, yellowish green, semi-transparent, dotted and spotted with dark

brown. Each segment or ring is provided with a transverse row of tubercles from which arise clusters of long spreading hairs, one pair of tubercles on the sides of the second segment much larger than any of the others and with a larger cluster of hairs; in each cluster there is one or more hairs, very long, longer in some instances than the entire body of the larva, there is a dark brown broken stripe along each side. Hairs mixed, brown and whitish. Changes take place in its appearance at each successive moult until finally it presents the appearance given in fig. 14, and is in adornment one of the most beautiful caterpillars we know of with its vermilion red head and collar, the graceful pencils of long black hairs at each extremity, and the cream coloured brushes or tufts along its back.

Nine different parasites have been found infesting this larvæ. These friendly helpers must do much towards keeping this destructive creature within reasonable limits. Of 34 cocoons lately taken at random from different trees, only ten were found with eggs attached and quite a large proportion of the remainder were infested with parasites. Hence when collecting these cocoons in winter none should be taken or destroyed, but those which have egg masses on them, as all the others will contain either useful parasites or else the empty, harmless male chrysalis. As the female never travels beyond her cocoon, it is clear that this insect can only spread by the wanderings of the caterpillar or the careless introduction of eggs on young trees, no doubt the latter has been the most prolific source of evil.

THE APPLE-TREE BLIGHT.

This strange disease, affecting the tips of the branches of apple and quince trees, has been very common during the past summer, and has extended over a large portion of the western part of Ontario. The first specimens we received this year were from Mr. James Dougall, of Windsor. He writes, on the 27th of June, as follows—"I send you to day, by express, some twigs and shoots of apple and quince trees, affected by what I presume is the twig borer. I have never been able to discover any insects or larvæ in the shoots, but possibly I may have been late in looking for them. The year before last this pest was very bad down the lake shore, about Ruthven, the orchards were browned with it. Last year it attacked my larger apple trees badly, and in the nursery rows some Alexander trees, which were five years old, suffered, while the younger ones were not touched; this year it is worse than last. My quinces have been badly injured for the past three years."

On the same day we received another package from C. F. Treffry, of Hawtry, Ontario, with the following note—"I herewith enclose for your inspection some small branches from some of my apple trees. In passing through my orchard I was surprised to find three of my finest young trees affected as enclosed. I have watched closely for the insect which must have caused such damage, but without success; neither can I find anything in the Society's Report for 1873 which will give me any information respecting it."

This same disease affected the trees very much on the grounds of Mr. Charles Arnold, of Paris, and many orchards in that section of country were similarly injured. In our own location we observed it in one instance only, affecting a few fruit-bearing twigs on a quince tree. About Hamilton, and between that city and Dundas, we saw, in July, many trees which had been badly injured, and, on returning from New York, a few weeks later saw evidences of the same trouble in some of the apple orchards in the western portion of that state. Thus it will be seen that this disease has affected many trees in widely distant portions of our country, and probably has extended much further than we are at present aware of. We shall be glad to hear from our fruit-growing friends in reference to this matter.

The advent of this disease is shown by a sudden withering of the twigs and extremities of the branches, particularly the fruit bearing portions, and embracing the whole of the new growth. Soon the leaves appear as if scorched, and the wood of the affected portions becomes black. Here the trouble seems to end, and later in the season the tree partially recovers its vigour and throws out new shoots from below the base of the affected portion. The fact of the fruit branches being principally involved tells heavily on the crop for the year, and makes this disease a much more serious matter than it would otherwise be. The effects produced are so similar in appearance to the damage done, in some instances by the twig borers that we do not wonder at the prevailing opinion that the injury is in some way caused by insects. The most careful examination, however, fails to reveal the slightest evidence of insect work, and, like the mysterious pear tree blight, its origin and progress are at present involved in

obscurity. From the fact of its affecting only the new and tender growth we should infer that some atmospheric agency is probably concerned in the production and propagation of this disease. At present we have no remedy to suggest.

ON SOME OF OUR COMMON INSECTS.

BY W. SAUNDERS.

THE CECROPIA MOTH (*Attacus Cecropia*, LINN.)

Among the many beautiful and wonderful insects native to this country, there is none which excites yearly more wonder and astonishment than the cecropia moth. Its size is enormous, measuring when its wings are spread from five and a half to six and a half inches across, and sometimes even more while its beauty is proportionate to its size. The accompanying figure 17 (after Riley) is a faithful representation of this magnificent creature. Both front and hind wings are of a rich brown, the anterior pair greyish, shaded with red,

FIG. 17.



the posterior more uniformly brown; near the middle of each of the wings there is a nearly kidney shaped white spot shaded more or less with red, and margined with black. A wavy dull red band crosses each of the wings, edged inside on the front wings more or less faintly with white, while on the hind pair the band is widely and clearly margined with the same color. The outer edges of the wings are of a pale silky brown in which on the anterior pair runs an irregular dull black line, which on the hind wings is replaced by a narrow, double broken band of the same hue. The front wings next to the shoulders are dull red, with a curved white and black band, varying much in distinctness in different specimens, and near their tips, there is an eyelike black spot with a bluish white crescent. The upper side of the

body and the legs are dull red, with a wide band behind the head and the hinder edges of the segments of the abdomen white; the under side of the body is also irregularly marked with white. The under surface of the wings is very much like the upper, but somewhat paler.

Cecropia was the ancient name of the City of Athens, and it has been a matter of surprise to some that Linnaeus should have given this name to our moth, Dr. Fitch throws light on this subject in the following words, "The great legislator of this department of human knowledge, as he is expressively styled by Latreille, it has been frequently remarked, was endowed with a genius which, but few of his disciples have inherited, for selecting names for natural objects, which are most appropriate and happy. The idea which was present in the mind of Linnaeus when he named this splendid moth, we think is sufficiently evident. The Athenians were the most polished and refined people of antiquity. The moths are the most delicate and elegant of insects; they were the Athenians of their race. Cecrops was the founder, the head of the Athenian people. When the names of men were bestowed upon cities, ships, or other objects regarded as being of the feminine, gender, classical usage changed these names to the feminine form. The moths (*Phalæna*) being feminine, and the name of Cecrops being more euphonious in this form, probably induced Linnaeus to change it in the manner he did. The name thus implies this to be the leader, the head of the most elegant tribe of insects, or in other words the first of all insect kind. What name more appropriate can be invented for this sumptuous moth." The figure we have given is that of a male which differs from the female in having a smaller abdomen and larger and more deeply feathered antennæ or feelers.

During the winter months, when the apple trees are leafless the large cocoons of this moth may be found here and there, firmly bound to the twigs, they are also frequently found

FIG. 18.



on currant bushes, and occasionally also on lilac, cherry, hazel, plum, blackberry, maple, willow and some other shrubs and trees; for this insect in its larval stage is a very general feeder. The cocoon, see fig. 18, (after Riley) is about three inches long, pod shaped and of a dirty brown colour, and is entirely constructed of silk, the fibres of which are very much stronger than those of the common silk worm *Bombyx mori*. The silk has been worked to a limited extent and manufactured into socks and other articles, which have been found very durable; but a drawback to the advancement of this branch of industry lies in the fact that the caterpillars do not bear confinement well, and hence are not easily reared.

The exterior structure of the cocoon is very close and papery-like, but on cutting through this, we find the interior—surrounding the dark brown chrysalis—made up of loose fibres of strong yellow silk. This snug enclosure effectually protects the insect in its dormant state from the extremes of weather during the long wintry months. When the time approaches for the escape of the moth, which is about the beginning of June, the internal dark brown chrysalis is ruptured by the struggles of the occupant, and the newly born moth begins to work its way out of the cocoon. As it is possessed of no cutting instrument of any kind, this would indeed be a hopeless task had not the all-wise Creator made a special provision for this purpose, and to this end a fluid adapted for softening the fibres is furnished just at this juncture and secreted from about the mouth. On listening to the creature as it works its way through, you hear a scraping, tearing sound, which is made by the insect working with the claws on its fore-feet, tearing away the softened fibres and packing them on each side to make a channel for its escape. The place of exit is the smaller end of the cocoon, which is more loosely made than any other part and through which, after the internal obstacles are overcome, the passage is effected without much further trouble.

We have frequently watched their escape. First through the opening is thrust the anterior pair of bushy looking legs, the

sharp claws of which fasten on the outside structure ; then with an effort the head is drawn forward, suddenly displaying the beautiful feather-like antennæ ; next, the thorax, on which is borne the other two pairs of legs, is liberated, and finally, the escape is completed by the withdrawal of the abdomen, through the orifice thus made. Queer looking creatures they are when they first put in an appearance, with their large, fat, juicy bodies, and tiny wings. When the wings are fully expanded they measure from five to six inches or more across, but when fresh from the chrysalis they are but very little larger than the wings of a bumble bee. The first necessity now for the welfare of the individual is to find a suitable location where the wings may be held in a good position for expanding, for without such favourable circumstance they would never attain a serviceable size. It is necessary that a position should be secured where the wings may hang down as they are expanding, for which purpose the under side of a twig is often selected ; and here, securely suspended by the claws, the wings undergo in a short time the most marvellous growth it is possible to imagine. The whole process, from the time of the escape of the moth to its full maturity, seldom occupies more than from half an hour to an hour, and during this time the wings grow from the diminutive size already mentioned to their full measure and capacity.

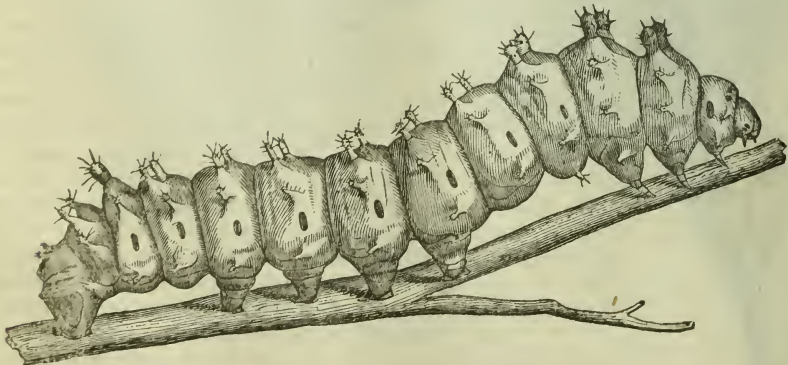
A wing clipped from the insect immediately after its escape, and examined under the microscope, reveals the fact that the thousands and tens of thousands of scales with which the wings are covered, and which afterwards assume such beautiful feather-like forms, are now nearly all threadlike and undeveloped. Impressed with this thought, the mind is fairly astonished at the almost incredible change wrought in so limited a time, for the growth embraces not only the extension of the surface of the wing, but the enlargement and maturity of every scale or feather on it, the individuals of which are but as dust to the naked eye. What a wonderful and intricate system of circulation and power of nutrition must be possessed to accomplish this marvellous result !

Soon after their exit these moths seek their mates, and after pairing, the female begins to deposit her eggs, a process which occupies some time, for the eggs are not laid in patches or groups, but singly ; and are firmly fastened with a glutinous material to the under side of a leaf ; and as it is seldom there are more than one or two laid on any single tree or bush, a considerable distance must be traversed by the parent in the transaction of this all important business.

The number of eggs which these moths lay is astonishing, we have known a single female to deposit within three days as many as 217. The eggs are about one-tenth of an inch long, nearly round and of a dull creamy white colour, with a reddish spot or streak near the centre, the duration of the egg stage is usually from about a week to ten days.

At the expiration of this period the larva eats its way out of the egg, the empty shell of which furnishes the young creature with its first meal. On its first appearance it is black, with little shining black knobs on its body, from which arise hairs of the same colour. Being furnished with a ravenous appetite its growth is very rapid ; and from time to time its exterior coat or skin becomes too tight for its comfort, when it is ruptured and thrown off. At each of these changes or moultings, the caterpillar appears in an altered garb, gradually becoming more like the full grown larva represented by Fig. 19. It is very handsome. Its body is pale

FIG. 19.



green, the large warts or tubercles on the top of the third and fourth segments are coral red, the remainder are yellow excepting those on the second and terminal segments, which, in common with the smaller tubercles along the sides, are blue. During its growth from the diminutive creature as it escapes from the egg to the monstrous-looking full grown specimen, it consumes an immense amount of vegetable food; and especially as it approaches maturity is this voracious appetite apparent. Where one or two have been placed on a young apple tree, they will often strip it entirely bare before they have done with it, and thus prevent the proper ripening of the wood, entailing damage to the tree, and, sometimes, endangering its life; hence, during their season, they should be watched for and destroyed. During the winter months, their cocoons may be looked for, and removed in time to check their further spread.

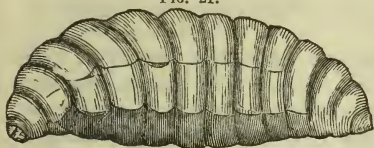
The natural increase of this insect being so great, wise provisions have been made to keep it within bounds. Being such a conspicuous object it sometimes forms a dainty meal for the larger birds; there are also enemies which attack the egg and young larvæ and besides these there are several parasites which live within the body of the caterpillar and destroy it before reaching maturity. One of the largest of these parasites is the long tailed Ophion

(*Ophion macrurum*, Linn.) Fig. 20 (after Riley). This is a large yellowish brown Ichneumon fly, and is perhaps one of the commonest parasites affecting the Cecropia. The female of this fly deposits, according to Mr. Trouvelot, from eight to ten eggs upon the skin of her victim. These eggs soon hatch into young larvæ which eat their way through the skin of the caterpillar, and at once begin to feed upon the fatty parts within. As only one of these parasitic larvæ can find food sufficient to mature, the rest either die from hunger or are devoured by the strongest survivor.

Mr. Riley, in *Am. Ent.*, Vol. II., says, "After the Cecropia Worm has formed its cocoon, the parasitic larva which had hitherto fed on the fatty portions of its victim, now attacks the vital parts, and when nothing but the empty skin of the worm is left, spins its own cocoon, which is oblong oval, dark brown inclining to bronze, and spun so closely and compactly, that the

inner layers when separated have the appearance of gold beater's skin. If we cut open one of these cocoons soon after it is completed, we shall find inside a large, fat, legless grub, Fig. 21,

FIG. 21.

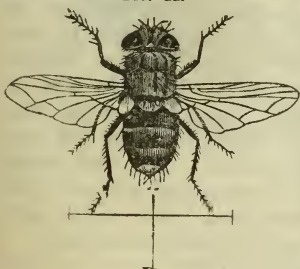


which sometimes undergoes its transformations and issues as a fly in the fall, but more generally waits until the following spring.

"The Ichneumon Fly, last mentioned, usually causes a dwarfed appearance of the worm which it infests, and parasitized cocoons can generally be distinguished from healthy ones by their smaller size. The larvæ of the Ta-

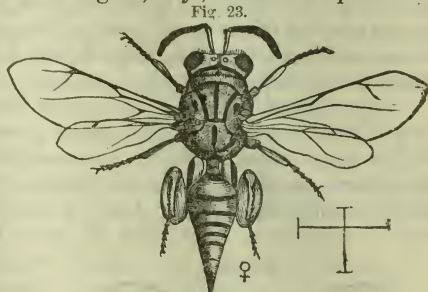
china Fly which we now introduce to our readers, as parasitic on the Cecropia Worm, seem to produce an exactly opposite effect, namely, an undue and unnatural growth of their victim. In the beginning of September, 1866, we received an enormous Cecropia Worm. It measured over four inches, was a full inch in diameter, and weighed nearly two ounces, but like many other large specimens which we have since seen, it was covered with small oval, opaque, white egg-shells, clusters of four or five occurring on the back of each segment, invariably deposited in a transverse direction. The skin of the worm was black, where the young parasites had hatched and penetrated. The large worm soon died and rotted, and in about twelve days a host of maggots gnawed their way through the putrid skin. These maggots averaged about one-half inch in length, and in form were like those of the common Blow-fly. The head was attenuated and retractile and furnished with two minute curved hooks, and the last segment was squarely cut off, slightly concave and with the usual two spiracles or breathing holes which this class of larvæ have at their tails. Their colour was of a translucent yellow, and they went into the ground and

FIG. 22.



remained in the larva state all winter, contracted to pupæ in the April following, and the flies commenced to issue the last of May." This fly differs so little from the red tailed Tachina Fly (*Exorista militaris*, Walsh), see Fig 22, which infests the army worm that Mr. Riley is inclined to regard it as a variety of that species.

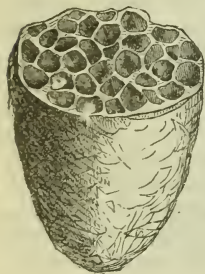
The *Cecropia chalcis* fly (*Chalcis Maria* Riley). We quote again from Mr. Riley.—"In May, 1869, we received from Mr. V. T. Chambers, of Covington, Ky., numerous specimens of the beautiful large chalcis fly figured herewith (Fig. 23), which he had taken from the cocoon of the Polyphemus moth, which is quite common and issues as early as the middle of February in that locality. He says, 'I was satisfied that the cocoon did not contain a living Polyphemus, and therefore opened it. It contained so little besides these insects and their exuviae as to suggest strongly the old idea that the caterpillar had been metamorphosed into them (as in a sense it had). There were 47 of them, of which 23 were females. As all the males and some of the females were dead when I opened the cocoon, I think it likely that the former never do emerge, and perhaps but few of the latter; otherwise Polyphemus would soon be exterminated.'



Colours Black and Yellow.

"We can very well imagine that most of these chalcis flies would die in their efforts to escape from the tough cocoon of the Polyphemus, but it so happens that these same insects have been found by Mrs. Mary Treat, of Vineland, New Jersey, to prey upon the cecropia worm, from the cocoon of which they can much more easily escape.

Fig. 24.



"The Divorced Cryptus (*Cryptus nuncius*, SAY,—*extrematis*, CRESSON), another Ichneumon fly, infests the cecropia worm in great numbers, filling its cocoon so full of their own thin parchment-like cocoons that a transverse section (Fig. 24) bears considerable resemblance to a honeycomb. The flies issue in June, and the sexes differ sufficiently to have given rise to two species. We have bred seven females and twenty-nine males from a cocoon of the cecropia moth, all the males agreeing with the species described by Say as *nuncius*, and all the females agreeing with that described afterwards as *extrematis* by Mr. Cresson.

THE CLOUDED SULPHUR BUTTERFLY (*Colias Philodice*, GODT).

The clouded sulphur is everywhere one of our commonest butterflies, abundant in its

Fig 25.



Fig. 26.



Colours Yellow and Black.

season, in fields and roadways, frequently congregating in groups on the borders of streams and springs, where, in hot weather, they seem to enjoy settling on the cool, moist ground. They are still more abundant in clover fields as the season advances.

The female of this species differs somewhat in its markings from the male, as will be readily seen by reference to the figures, 25 representing the male, 26 the female. The ground colour of the wings in both sexes is bright yellow marked on the outer edge with a dark brown or blackish border, narrower in the male than it is in the female, while in the latter it encloses on the anterior wings a broken row of irregular yellow spots, there is also a spot of black placed near the front edge of the fore wings, about half way between the base and tip, varying in form and distinctness. The hind wings in both sexes are less heavily margined, and near the middle is a dull, pale orange spot. Both wings are dusky towards the base, and the fringes are pink.

On the under surface the yellow colour is less

bright, while the dark margins are either entirely wanting or else represented by a dusky shade margined occasionally within by a few dull brownish dots. The spot on the forewings is distinct, but paler and usually centered with a small silvery eye. That on the hind wings is much more distinct than above, being composed of a bright silvery spot in the centre defined by a dark brown line which is in turn encircled with dull orange. Immediately above and a little towards the outer edge is a much smaller spot of the same character; there is also a reddish dot on the anterior edge, about the middle of the wing. The antennæ are pink, with the knobs at their tips of a darker shade; the body is dark above; paler at the sides and underneath.

The insect appears first on the wing about the middle of May, becoming more plentiful towards the latter end of the month, but the time of its greatest abundance is later in the season, after the appearance of the second brood, which is during the latter part of July and throughout August. In the second volume of the "Entomologist," p. 8, Mr. Bethune remarks as follows: "On the 3rd of August, a lovely, bright, warm morning, after an excessively wet night, I drove about ten miles along country roads; every few yards there was a patch of mud, the effects of the heavy rain, and at every patch of mud there were from half a dozen to twenty specimens of *Colias philodice*, at least one, I should think for every yard of distance I travelled. I must then have seen, at a very moderate computation, about ten thousand specimens of this butterfly."

The caterpillar of the Clouded Sulphur feeds on the cultivated pea, on clover, on the Blue Lupin, *Lupinus perennis*, and no doubt on many other plants belonging to the order *Leguminosæ*. The egg, which is a beautiful object, is about one twenty-third of an inch in length, tapering at each end, with twelve or fourteen raised longitudinal ribs, with smaller cross lines in the concave spaces between them. Its colour when first deposited is of a pale lemon yellow, which changes in three or four days to a pale red, then gradually to a bright red, and from that to dark brown just before the time of hatching. The duration of the egg stage is about seven days.

The young caterpillar just hatched is one-twelfth of an inch long and of a dull yellowish brown colour, but when a little older it changes to a dark green. When full grown it is about an inch long, with a dark green head and body, the latter with a yellowish white stripe on each side close to the under surface, with an irregular streak of bright red running through its lower portion. The body also has a downy look occasioned by its being thickly clothed with very minute pale hairs.

The chrysalis is about seven-tenths of an inch long, attached at its base, and girt across the middle with a silken thread. Its colour is pale green with a yellowish tinge, with a purplish red line on each side of the head, darker lines down the middle both in front and behind, and with a yellowish stripe along the sides of the hinder segments.

During the heat of summer the chrysalis state usually lasts about ten days. A day or so before the butterfly escapes the chrysalis becomes darker and semi-transparent, the markings on the wings showing plainly through the enclosing membrane.

THE WHITE-LINED MORNING SPHINX (*Deilephila lineata*, FABR.)

Fig. 27.



Colours Olive, white and rose.

The white-lined morning sphinx is a tolerably common insect throughout Ontario. It is seen on the wing generally about twilight or later, although it has been met with occasionally in the day time. In its flight it much resembles the humming bird, hovering over flowers into which it inserts its long and slender tongue in search of the nectar there stored, which constitutes its food. In common with many other sphinx moths its structure is robust and its flight rapid and power-

ful : hence it is difficult to capture, and even when taken will often flutter with such force as to seriously damage the covering and structure of its beautiful wings. When its wings are fully spread they measure from three to three-and-a-half inches across, (see Fig. 27, after Riley). The ground colour is a rich greenish olive. On the fore wings there is a pale band about the middle, extending from near the base to the tip, and, along the outer margin runs another band nearly equal in width, but darker and less distinct; the veins also are lined with white. The hind wings which are small, are nearly covered by a wide central rosy band, becoming paler as it approaches the body, the hinder edge is fringed with white. On the anterior portion of the body there are six longitudinal stripes or lines, while the hinder part is alternately spotted with white and black. The entire under surface is much paler and duller in colour than the upper.

"The larva," Mr. Riley says, "feeds upon purslane, turnip, buckwheat, water melon, and even apple and grape leaves, upon any of which it may be found in the month of July. It descends into the ground, and within a smooth cavity, changes into a light brown chrysalis, from which the moth emerges during the month of September."

"The most common form of the larva is that given at Fig. 28. Its colour is yellowish green, with a prominent subdorsal row of elliptical spots, each spot consisting of two curved

Fig. 28.



black lines, enclosing superiorly a bright crimson space, and inferiorly a pale yellow line—the whole row of spots connected by a pale yellow stripe, edged above with black. In some specimens these eyelike spots are disconnected, and the space between the black crescents is of a uniform cream colour. The breathing holes are either surrounded with black or with black edged with yellow. The other form is black, and characterized chiefly by a yellow line along the back, and a series of pale yellow spots and darker yellow dots, as represented

Fig. 29.



in the illustration Fig. 29, even this dark form is subject to great variation, some specimens entirely lacking the line along the back, and having the spots of different shape."

"This insect has a wide range, as it occurs in the West Indies, Mexico and Canada, as well as throughout the United States. Feeding as it does, principally on plants of but little value, and being very commonly attacked by the larvæ of a *Tachina* fly, this insect has never become sufficiently common to be classed as injurious."

GRASSHOPPERS OR LOCUSTS.

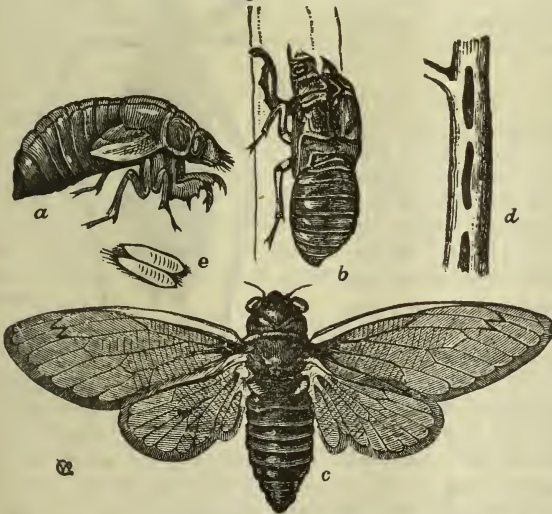
BY THE REV. C. J. S. BETHUNE, M.A.

Few, probably, of our Canadian fellow-countrymen are aware that the terrible Locust, "the scourge of nations," as it has been fitly termed, about whose destructive powers they read such appalling accounts in books of Oriental travel, is one of the insect enemies that some of the denizens of our Dominion have to contend against. And yet it is too true—as the records of the past season in our North-west Province of Manitoba abundantly prove. The locusts (or grasshoppers, as they are incorrectly termed) have laid waste great tracts of fertile country, and have brought ruin and desolation to many an unhappy settler in that far off region.

It is much to be regretted—to quote our remarks made on a former occasion*—that so much confusion exists in the popular use of terms in Natural History, and particularly in entomology, in consequence of which very serious errors become matters of common faith, much mischief is allowed to go unheeded, and the innocent are oftentimes punished for the guilty. The term "bug," for instance, is almost universally applied in the neighbouring States, and very generally in this country, to every kind of insect, so that it is no uncommon thing to hear a beautiful butterfly or lovely moth designated by the odious name of "bug," whereas the appellation belongs exclusively to those foul-smelling sucking insects of the order *Hemiptera*, which feed upon the juices of plants, and in some cases upon the blood of other insects, of animals and man. Again, the larva of almost every kind of insect is called "the grub;" larvæ that burrow into the trunks of trees and timber, "the borer," and so on to any extent. The consequence is that what is a remedy for one grub or borer, or so-called "bug," is indiscriminately made use of for the destruction of every other grub, or borer, or "bug," unmindful that the old proverb may be read in this way also—"What is one insect's meat is another's poison," and that the treatment that will exterminate one injurious insect is sometimes perfectly harmless in the case of another.

This confusion of terms is particularly unfortunate in the case of the insects that we are now treating of. Every one in this country is perfectly familiar with what is commonly

Fig. 30.



called a "grasshopper," but how very few are aware that what they term a grasshopper, and see too often to think much about, is really the same kind of insect as the much dreaded, famine-producing Locust, that constituted one of the plagues of Egypt, and that is an object of so much terror wherever it prevails. A true locust it nevertheless is, and it were well, for many reasons, that our people became accustomed to call it by its right name. Our common species in this Province, while it does not possess the power of suddenly appearing in vast numbers and emigrating from place to place, occasionally becomes greatly multiplied and proves very destructive. The western locust (or grasshopper), however, differing but very slightly from our species, is, as we shall presently

show, quite as formidable a destroyer as its Oriental congener.

* *Canada Farmer*, 1867, page 87.

While the true American Locusts are commonly called grasshoppers, and the true grasshoppers are termed crickets, katydids, &c., another element of confusion is mingled with our insect nomenclature by the common practice of giving the name of locust to the cicada, a totally different insect belonging to an entirely different order. The accompanying illustration will shew the reader the difference between these three kinds of insects better than any written description. Figure 30 represents different stages in the life of the Cicada or so-called "Seventeen year Locust" (*C. Septem-decim* LINN). *a* is the pupa; *b* the empty pupa case after the perfect insect has emerged from it; *c*, the perfect or winged insect; *d*, the perforations in a twig for the deposition of eggs; *e*, the egg. Figure 32 represents a katydid or true grasshopper (*Cyrtophyllum concavum*, SAY); and Figure 31 a true locust or so-called grasshopper (*Caloptenus spretus*, UHLER).

A single glance at these illustrations will shew the reader, the main differences between the three kinds of insects that we have been referring to. We wish it, therefore, to be plainly understood that in the account that follows: we shall use the term "Locust" in reference to the devastating insect represented in Figure 31, which is so often called a "grasshopper."

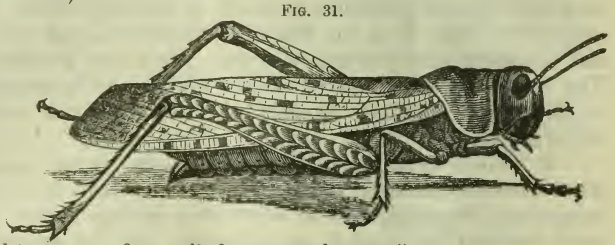


FIG. 31.

HISTORY OF THE LOCUST IN AMERICA.

From the various works that we have been able to consult we gather that visitations of locusts have occurred on a more or less extensive scale, from time to time, ever since the Central and Western portions of this Northern Continent have been occupied by Europeans. We have no difficulty, then, in believing that from time immemorial these destructive insects have played their important part in maintaining the balance of animal and vegetable life in accordance with the grand laws of the Omnipotent Creator. The earliest notice that we have found of a visitation of locusts refers back more than two centuries, to a period much anterior to the discovery of the Mississippi River by La Salle. In Gage's West Indies the following account is given of one of these visitations in Guatemala in the year 1632:—

"The first year of my abiding there it pleased God to send one of the plagues of Egypt to that country, which was of locusts, which I had never seen till then. They were after the manner of our grasshoppers, but somewhat bigger, which did fly about in numbers so thick and infinite that they did truly cover the face of the sun, and hinder the shining forth of the beams of that bright planet. Where they lighted, either upon trees or standing corn, there was nothing expected but ruin, destruction and barrenness; for the corn they devoured, the fruits of trees they ate and consumed, and hung so thick upon the branches that with their weight they tore them from the body. The highways were so covered with them that they startled the travelling mules with their fluttering about their heads and feet. My eyes were often struck with their wings as I rode along; and much ado I had to see my way, what with a montero wherewith I was fain to cover my face, what with the flight of them which were still before my eyes. The farmers towards the South sea-coast cried out, for that their indigo, which was then in grass, was like to be eaten up; from the Ingenios of sugar the like moan was made, that the young and tender sugar-canes would be destroyed; but, above all, grievous was the cry of the husbandmen of the valley where I lived, who feared that their



Fig. 32.

corn would in one night be swallowed up by that devouring legion. The care of the magistrates was that the towns of Indians should all go out into the fields with trumpets, and what other instruments they had, to make a noise and to affright them from those places which are most considerable and profitable to the commonwealth; and strange it was to see how the loud noise of the Indians and sounding of the trumpets defended some fields from the fear and danger of them. Where they lighted in the mountains and highways, there they left behind them their young ones, which were found creeping upon the ground, ready to threaten such a second year's plague, if not prevented; wherefore all the towns were called, with spades, mattocks and shovels, to dig long trenches and therein to bury all the young ones. Thus, with much trouble to the poor Indians and their great pains (yet after much hurt and loss in many places) was that flying pestilence chased away out of the country to the South Sea, where it was thought to be consumed by the ocean, and to have found a grave in the waters, whilst the young ones found it in the land. Yet they were not all so buried, but that shortly some appeared, which, being not so many in number as before, were with the former diligence soon overcome."

About a century later than the date of the above account, the locusts are recorded to have laid waste, on several occasions, all the vegetation of Mexico and Yucatan, and to have produced famine and much consequent suffering among the people. To California, they appear to have been especially partial from the earliest times. The Jesuit Father Michael del Barco, who lived for thirty years in that country as a missionary among the heathen Indians, relates that from the arrival of the Jesuits in 1697 to the year 1722, they were free from any plague of locusts, but that in this year they caused fearful sufferings among the inhabitants. In 1746 and for three years following without intermission, they again invaded the land; after this they did not appear until 1753 and 1754; and finally, before the expulsion of the Jesuits, in 1765 and the two following years. Clavigero, in his History of California, gives a very interesting account of these several invasions, and describes the appearance and natural history of the insect with much minuteness; from his work we make the following extracts:—

"The female, at the latter part of July or early in August, lays a number of fine small eggs of a yellowish colour, in a string, united with a glutinous matter, which appears like a cord of fine silk. These are deposited together and dropped into a small hole which they make in the ground with a small apparatus attached to their tails. Each female lays from seventy to eighty eggs, and sometimes more.

"The birth of these new grasshoppers has no particular time, but is dependent upon the early or late appearance of the rains, but they generally hatch during the latter part of September or early in October. . . . Their life, from birth to death, lasts ten months, during which they cast their coats twice and change their colours five times. When the wings have become of sufficient strength and the body at its maturity, they then begin to ascend into the air and fly like birds, and commence their ravages in every direction, desolating the fields of every green thing. Their numbers become so extraordinary, that they soon form clouds in the atmosphere, of which the rays of the sun cast a shadow as they fly. They unite in masses of ten to twelve thousand, always following their conductors and flying in a direct line without falling behind, for they consume every growing thing before them. To whatever height their guides conduct them to obtain a sight of their food they follow, and as soon as growing crops or any verdure is sighted, instantly the swarm will alight and speedily devour and devastate the fields around to that extent, and with that promptitude, that when they are seen by a new swarm of their fellows, there is not anything more left to injure or consume.

"This lamentable insect plague is bad enough in old and cultivated countries, but in the miserable peninsula of California, where they eat up the crops, green trees, fruits, and pastures, they cause great mortality in the domestic animals of the missions, and with the effect of their ravages on the cereals and other garden productions cause great famines and sickness among the inhabitants and neophytes of the establishments. At one time immense multitudes of these voracious insects died, infecting the air dreadfully with the stench of their corruption and decay."

In Upper California, the Franciscan Missions of the early part of the present century, have suffered in a very similar manner. About the year 1827 or 1828, they ate up—we are told—nearly all the growing crops, and occasioned a great scarcity of wholesome food; again in

1834, they "destroyed all the crops of the rancheros and missions, with the exception of the wheat." In 1838, the field crops and gardens were again nearly destroyed. In 1846, there was another serious visitation, which extended over some of what are now termed the Western States, as well as California. In 1855, to pass over lesser visitations, there came one of the most terrible of all the recorded plagues of Locusts in California. As related by Mr. Taylor, of Monterey, (Smithsonian Report, 1858), between the middle of May and October, 1855, "these insects extended themselves over a space of the earth's surface, much greater than has ever before been noted. They covered the entire Territories of Washington and Oregon, and every valley of the State of California, ranging from the Pacific Ocean to the eastern base of the Sierra Nevada; the entire Territories of Utah and New Mexico; the immense grassy prairies lying on the eastern slopes of the Rocky Mountains; the dry mountain valleys of the Republic of Mexico, and the countries of Lower California and Central America, and also those portions of Texas which resemble, in physical characteristics, Utah and California. The records prove that the locusts extended themselves, in one year, over a surface comprised within thirty-eight degrees of latitude, and in the broadest part, eighteen degrees of longitude." The Sacramento newspapers of that year were filled with details of the plague; most accounts compared the swarms, when in flight, to dense snow-storms; they consumed everything before them—the foliage of trees, orchards, gardens, vineyards, fields of young grain, of crops and vegetables—everything was eaten up in a particular locality in a single day, leaving the ground a withered, blackened desert. That summer of 1855, was observed to be the hottest and driest that had been known for ten years."

During the next two years, 1856-7, the plague was almost entirely confined to the region lying east of the Rocky Mountains, and extending in places as far as the Mississippi River; throughout the States of Minnesota, Nebraska and Kansas, the locusts were especially destructive. Ten years later, in the summer of 1866, another noteworthy visitation took place throughout the same region. A correspondent of a Rock Island, Ill., paper (see *Practical Entomologist*, vol. ii., page 3), thus describes the plague in Nebraska: "The last day of August, near the middle of the afternoon, quite a number of grasshoppers were seen alighting, and that number rapidly increased till a little before sunset. The next morning they appeared much thicker, but were only so from having crawled more into the open air to sun themselves. About nine o'clock they began to come thicker and faster from a northerly direction, swarming in the air by myriads, and making a roar like suppressed distant thunder. By looking up to the sun they could be seen as high as the eye could discover an object so small, in appearance like a heavy snow storm. Each grasshopper very much like a very large flake, save that it passed by instead of falling. The number was beyond imagination, the air was literally full of them and continued so till late in the afternoon, countless millions passed on leaving other countless millions covering the earth and devouring the vegetation." Another writer from Kansas states that "Yesterday, September 10th, the locusts made their appearance here, and are devouring everything green. They almost darken the sun in their flight. I put in 65 acres of wheat in the last week of August, which looked fine, but it has nearly all disappeared; by to-morrow night there will not be a spear left. Early sown wheat will be totally destroyed." From the description given by another writer in Kansas, we may quote the following graphic account:—"There is something weird and unearthly in their appearance, as in vast hosts they scale walls, housetops and fences, clambering over each other with a creaking, clashing noise. Sometimes they march in even regular lines, like hosts of pigmy cavalry, but generally they rush over the ground in confused swarms. At times they rise high in the air and circle round like gnats in the sunshine. At such times, I think, they are caught by currents of our prevailing westerly winds and are thus distributed over vast tracts of country." The foregoing extracts will give our readers some little idea of the mode of appearance and the destructive powers of the locusts in the west. We might fill pages, a volume indeed, with similar accounts.

The next year 1867, and to some extent also in 1868 the locusts reappeared throughout the same region, and extended further to the eastward as well as westward. They proved more or less destructive in Western and Central Iowa, and in North Western Missouri, as well as almost all over Nebraska, Kansas, Texas and Utah. They have never, so far as we have been able to ascertain, passed to the eastward of the Mississippi River.

In 1869 and 1870, the ravages of the locusts seem to have been confined on this side of the Rocky Mountains, to portions of Nebraska, Colorado and Utah.

THE PLAGUE OF LOCUSTS IN 1874.

Let us now turn to the terrible visitation of the present year, from the effects of which so many thousands are now suffering the privations of famine throughout immense tracts of country.

Last year (1873) the locusts or grasshoppers were stated to have inflicted considerable damage upon crops of various kinds in some of the Western States, principally Nebraska and Kansas; here and there also in Minnesota, Iowa and Dakota there were comparatively trifling visitations. But in the month of July of this year there began one of the most serious invasions that has ever occurred in the west. In point of numbers and in extent of area affected, the plague was probably, no greater than on some previous occasions, notably that of 1855 that we have referred to above; the great difference, however, is caused by the fact that twenty years ago the country west of the Mississippi River was an almost uninhabited wilderness of prairie, while now it is traversed by a net work of railways, covered with populous towns and villages, and occupied to a very large extent by multitudes of industrious people. Twenty years ago the locusts affected the food supply, perhaps, of the buffalo, the Indian, and the scattered frontier settlers, but now their ravages cause destitution and misery in tens of thousands of homes.

Up to the beginning of July this year, all looked bright and fair for the western farmer. His crops of all kinds were, as a rule, growing luxuriantly; the prospect of a bountiful harvest was quite as good as usual. After that date, however, sooner or later in different localities, all these bright prospects were overclouded, in many instances utterly destroyed. The following extracts from various newspapers will abundantly tell the tale.

As early as the 19th of July a correspondent of the *Prairie Farmer* writes from Howard County, Nebraska: "Corn and potatoes were doing well until recently, when the grasshoppers [locusts] put in an appearance, and the result undoubtedly is, at the present moment, that there is not ten per cent. of these crops and of late oats left in this and the two neighbouring counties; and it is very doubtful if the countless millions of Vandals will leave a vestige of any green thing. The result must be almost certain starvation for new-comers, and must retard the development of this beautiful country for many years."

A lady correspondent of the same paper writes a few days later from Butler County, also in Nebraska:—"The low-hung clouds have dropped their garnered fullness down." But alas! and alack! they were not the long-looked-for rain clouds, but grasshoppers. As I told you before, they passed over on the 23rd, only a few alighting; but a strong south-west wind on the 24th brought back countless millions; and on the 25th their numbers were fearful to contemplate. They would rise in the air when the sun shone hot, but as it grew cooler they came down like the wolf on the fold. They settled like huge swarms of bees on every living thing. Fields of corn that had been untouched before were now stripped of tassel and blade. A field of early corn was being eaten so fast, that the girls went to save a few ears, instead of going to visit a sick schoolmate according to promise. Trees were so loaded with the pests, that those four and five feet high bent down till the tops touched the ground, and in some instances broke off; for three dreadful hours they dashed against the house like hail. So many came in at doors and windows that every aperture was closed; but not till they were so thick on the windows, that we were forced to make a business of slaying. The 25th of July will be remembered by the citizens of this and some other counties as the dark day, when desolation and devastation stared us in the face. * * * The wheat which was at first thought to be out of harm's way was cut off about one-fourth by the destroying angels. A statement in our county paper says the average will be about 8 or 9 bushels per acre. After the grasshoppers stopped their depredations, there were several damp cloudy days, that brought out new tassels and silks on the corn, but more than a week of hot, dry weather, with scorching winds checked its growth, so there will be none, excepting a very few fields that partially escaped. Turnips have been grown since the rain; and it is to be hoped there will yet be some potatoes; sweet potatoes were not hurt so badly as the common potato. Broom corn, cane and Hungarian grass were unscathed."

A writer from St. Paul, Minnesota, to the paper above mentioned, says that the locusts "have undoubtedly destroyed five hundred thousand bushels of wheat, and are likely to destroy another half million of bushels." Later on in the season the *St. Paul Press* publishes the following statement in reference to the plague of locusts in Minnesota:—"It is safe to

estimate the tilled area in the ravaged district at 275,000 acres, and of the area in wheat in that district at 200,000 acres. Of this area, probably not less than 150,000 acres have been destroyed. This represents not less than 2,500,000 bushels of wheat devoured in the germ by the grasshoppers, or about one-twelfth of the wheat crop of the state. Add to this area 50,000 acres of oats, at 33 bushels per acre, or 1,320,000 bushels in all, or one-twelfth of the oat crop of the state; 20,000 acres of corn, at 32 bushels per acre, 340,000 bushels, or one twelfth of the corn crop of the state, and perhaps 20,000 acres more in rye, buckwheat, barley, potatoes and other crops—and the full extent of the grasshopper havoc cannot be easily estimated."

Our readers may further judge of the extent of the calamity and sufferings consequent upon it, from the following Pastoral Letter, issued by the Bishop of Minnesota, and appointed to be read in all the Churches in his Diocese:—*To the Clergy and Congregations of the Diocese of Minnesota*: You are aware that several counties of the State have been desolated by locusts. In May I visited Martin county and saw the beginning of their ravages. I laid the facts before the Governor. The plague has increased. Many homes are desolated. They have the right to look to us for relief. They are our own flesh and blood. They are our brothers. They are God's children. The scourge is an awful one. It may be for *our* sins. It may be to try our faith in God. It may be to test our humanity.

I ask your prayers and your alms. I recommend that an offering shall be taken up on the last Sunday in July, and that a further special contribution of money and provisions shall also be taken at our Annual Harvest Home Festival.

Please send your offerings to Hon. Isaac Atwater, Minneapolis, who will send them to the Committee in St. Paul.

Praying God to bless you,
Your friend and Bishop,

H. B. WHIPPLE.

Extract from a Widow's letter in Brown County.

"I mortgaged my farm to get seed last Spring. All is lost. What to do I do not know. It would take a tear out of a stone to hear the people talk. I had a nice piece of barley almost ready to cut. There is nothing left but the straw, the heads lying thick on the ground. Dear Bishop, I am almost heart-broken, and nearly crazy, to think of the long, cold winter, and nothing to depend on. May God help us. May the Lord look to every orphan and widow, and put it in the hearts of His children to help."

"The widow must not plead in vain."

The Bishop also issued a form of prayer for relief from the plague of locusts, to be used in the Churches throughout his Diocese.

From the September "Report of the Department of Agriculture," at Washington, we cull the following note from Kansas:—"The late summer and fall crops have been almost entirely destroyed by grasshoppers. The common jumping grasshopper did much damage through the early part of the season, but about the middle of August clouds of the flying ones made their appearance over the county, devouring and destroying vast quantities of vegetation. Gardens were quickly eaten up, corn-fields were stripped of leaves, and in many cases the corn was entirely eaten off; fruit trees are left with naked branches, and in many cases the half-ripened fruit is left hanging on the trees, presenting a sickening sight of death and destruction.

In addition to the actual loss by devastation, the loss caused by discouragement will be greater. Years of patient waiting, hard work, and self-sacrifice have been destroyed in a few days, with no known remedy for protection—just as the fruits of labour were beginning to be realized, destruction came—and the question with many is, "Is it of any use to try again?"

Here is a field for the Department of Agriculture. Some method of protection or relief must be had against the destruction of this insect, or an immense tract of magnificent country will never be what it would without this curse. I am one of those who believe all such things may be controlled by some practical method; it only requires study, enterprise and means to learn how. This county (Doniphan) could well afford to pay \$100,000 for a guarantee that no grasshoppers should ever trouble it again. I have learned that vegetation highly cultivated and growing vigorously is less liable to be destroyed than when on the decline or growing feebly. Thus it is we often see a single tree in an orchard eaten even to the bark,

while others of the same variety are not damaged so much ; and upon examination it will be invariably found that those mostly eaten were diseased, or had their vitality in some way impaired. This thing was noticeable when the same kind of insects were here six or seven years ago. Of all fruit trees, apple and pear trees suffer the most, while peaches, plums and cherries suffer the least. They eat the leaves off the apples, and leave most of the apples on, but of the peaches they will eat the fruit and leave the foliage ; but in many instances, when vegetation is not plenty, I understand they clean all as they go, and I have seen instances of this kind. The damage to vineyards in this county is not so great. They do not seem to relish grapes, and are satisfied by eating off the stems and letting the bunches fall to the ground. There will not be enough corn in this county to feed what stock there is in the county as it should be fed."

The same report states that "the plague"—as it justly terms it—is reported in two counties in Wisconsin, seven in Minnesota, five in Iowa, four in Missouri, thirty in Kansas and seven in Nebraska. It adds that "the wide-spread destruction which they (the locusts) have caused in the north-west has not been adequately described. In many places large masses of people will probably suffer during the coming winter for the necessaries of life, their crops having been swept by this remorseless enemy."

The next Monthly Report—that for October—records the prevalence of the plague in two more counties in Minnesota, two more in Iowa, four more in Missouri, four more in Kansas, four more in Nebraska, three in Texas, two in Colorado, and one in California. The following letter from Kansas is recorded "to give some idea of its ravages :"—"The farmers in my county had their land for wheat prepared in good time, and in a better condition than I ever saw. On the 6th of September the grasshoppers made their appearance all over the county. Farmers became alarmed and did not sow any wheat. About the 18th to the 20th they appeared to go away. Farmers commenced sowing and got in about two-thirds of their crop. On the 28th and 29th they came the second time, filling the air, reminding one of a snow-storm in December. Some who had sown early had wheat up nice, but you cannot find a spear in any place. Wheat which was sown before the grasshoppers came the first time has been eaten down, until the grain has finally ceased to grow. I am candidly of the opinion that every acre which is sown to-day in this county will have to be sown again. There is no other chance for it, and the great trouble will be that so many of our farmers have sown all their seed and are not able to buy again. And what will they do? Some who have not been two years on their claims are leaving them and going over into Missouri and Arkansas to winter—to find something to live upon."

We might go on to an almost unlimited extent with similar descriptions of the wide-spread devastation caused by these insects, and the consternation they have produced throughout the west. Every agricultural newspaper and a large number of city papers have published throughout the past season similar records of ruin and suffering. To assist their brethren in the afflicted regions, large sums of money have been contributed both by State Governments and by individuals ; but it is greatly to be feared that the utmost liberality will hardly save from ruin, though it may relieve temporarily, many farmers who had recently settled on those hitherto attractive plains. Not only, it should be remembered, have they suffered from a dire plague of locusts, but they have also been the victims of a long-continued drought ; accompanied in some localities by a terrible hot wind, resembling the *sirocco* that blasts southern Europe with the dry heat of the African desert ; to add also to their series of calamities, the Chinch-bug* destroyed in many places those crops that the Locusts spared.

To illustrate the reality and intensity of the sufferings that we have alluded to, we shall give one extract only out of a large number that might be quoted. The writer of a letter to the *Prairie Farmer*, dated Kearney, Nebraska, November 16th, thus describes the condition of things in his neighbourhood :—"Your readers have been pretty fully posted as to the ravages of locusts over this entire region, the devastation extending from Central Minnesota to the southern limit of Kansas, the whole country being almost as utterly destroyed, so far as provisions are concerned, as if it had been swept by the scathing flames. I speak more understandingly of my own neighbourhood, and shall endeavour to state facts that may be firmly relied upon, and which can be verified if necessary, by the testimony of others in my own

* For a description of the Chinch-bug, see the report of the Entomological Society of Ontario, for 1871.

vicinity. The wheat crop, what there was of it, considering the dry weather, was good. But fully one-half of the settlers had no wheat at all; their sole dependence was corn and potatoes. In many instances the very uncertain product of prairie sod. Thus nearly half of our people were dependent solely upon the two above articles, both of which were almost entirely swept away by drought, bugs and locusts combined. *Every* family nearly, that was able to do so, having friends in Iowa and Missouri, have gone there to winter, some may return, others never will. Many proved upon their claims and have left the country forever. The number of actual homestead settlers is thus reduced fully one-half in my own neighbourhood, and of that one-half, not one family in ten have provisions, fuel or clothing to last them through the winter. Fully two-thirds have not food enough to last until the 1st of December. I find from conversation in Kearney, with settlers both north and south for a distance of thirty to fifty miles, that the same statement holds true over almost the entire region. Thus notwithstanding the *cry* of some of our papers that "we are not beggars," more than two-thirds of those now on their homesteads must either beg or starve. In less than thirty days there will be starvation and death unless these needs are promptly met.

"There is no corn, no oats, no feed of any kind for stock, except what is shipped in from a distance. There is no fuel except coal, at from \$8 to \$11 per ton. There is no work, no money. There is no seed corn, and in very many instances, no seeds of any kind for another year's planting. On the 13th inst., I met two of my neighbours. One has a family of six to provide for, three of them young children. Says he: 'I have just flour enough to last until Saturday night.' The other has a family of ten, four of whom are sick, and have been since September. One child, a bright boy of some four years, has lost the entire use of his limbs, and now has to have the care of a helpless babe. This man has flour for ten days, and potatoes that will enable him to get along for a week or two longer. Last winter this family of children were entirely without shoes or stockings, with clothing just sufficient to cover nakedness, and ragged at that. The writer of this article has flour for a week—fifty pounds—and pays for it in breaking one acre of prairie, thus giving three dollars in work for \$1.20 worth of flour. He does not state this complainingly, being glad to get work to feed his five babies at any price. I merely give these three cases as a sample. While I give but three, there are many others all around me in fully as deplorable a situation. This want extends over the whole area of country, west, north and south, and the farther the settlement is from the supplies, the greater the wants and privations of the settlers."

THE PLAGUE OF LOCUSTS IN MANITOBA.

Thus far we have been describing the extent and the terrible results of this year's plague of Locusts in the Western States of the Union. We have now, unhappily, to record its occurrence in our own new Province of Manitoba, which adjoins the State of Minnesota so frequently referred to above. From the following record of visitations previous to this year, it will be observed that they were, in almost all cases, simultaneous with those in the neighbouring States, that we have described in the earlier part of this paper. For this record we are indebted to the letter of the Winnipeg Correspondent of the *Toronto Globe*, which appeared in that paper on the 5th of August last:—

"Grasshoppers first appeared in Red River towards the end of July, 1818, six years after the commencement of the settlement. They covered the settlement belt, but did not utterly destroy the wheat crop, it being nearly ripe at the time. Barley and other crop were swept away. They deposited their eggs and disappeared, and the following spring the crop of young grasshoppers was immense. These departed before depositing their eggs, but devoured all vegetation on their route, thus destroying all the crops of 1819. Great numbers came in during the season of 1819 and deposited their eggs, so that in 1820 the crop were again all destroyed. Thus for three successive years were the crops in this country destroyed by these pests. They then disappeared for thirty six successive years, the next visitation being in 1857, when they visited the Assiniboine settlement, doing but little injury beyond depositing their eggs. The following season their progeny destroyed all the crop within their reach. In 1864 they again appeared in considerable numbers but did little injury to the wheat crop. The following year the young grasshoppers partially destroyed the crops, leaving many districts entirely untouched. The largest swarm ever known came in August, 1867, but the crops were so far advanced that season that they did but little ir

jury. Their eggs produced such immense swarms the following spring that they destroyed everything that had been sown throughout the settlement, and famine ensued. In 1869 they again visited the country, but too late to do much harm. The season following, however, they destroyed most of the growing crops. In 1872 immense hordes of these winged pests again visited a part of the country about the beginning of August. The country west of Headingly escaped, and generally the wheat was not much injured, but they played sad havoc with the gardens. Nothing was sown the following spring throughout the infested district, but throughout the western settlements a large crop was grown and saved."

From the same source we have obtained the following particulars respecting the ravages of the Locust in different parts of the Province:—

"THE SOUTH.—From West Lynne (Pembina) northward as far as Scratching River the oats and barley have been entirely destroyed, and the wheat partially.

"PALESTINE.—The latest reports from this settlement confirm the accounts that the settlement is laid waste.

"MANITOBA LAKE.—The shores of this lake are strewn three feet in many places with dead grasshoppers, the wind having driven them into the lake, where they were drowned and cast ashore.

"THE BOYNE SETTLEMENT.—They are very thick here, and have completely destroyed the oats and barley, and about half ruined the wheat.

"PORTAGE LA PRAIRIE.—From Poplar Point to the Portage the fields are swarming with grasshoppers, which have devoured the crops. Scarcely anything has escaped.

"RAT CREEK.—In this neighbourhood it is reported that the crops of Kenneth McKenzie, Hugh Grant and others, are being destroyed, and that the former had commenced cutting his oats and barley for fodder rather than let the pests take all.

"ROCKWOOD.—The crops in this settlement have suffered severely. Oats and barley completely destroyed, and wheat badly injured.

"WOODLAND.—Most of the settlers in this neighbourhood are entirely cleaned out.

"COUNTY OF PROVENCHER.—All the crops along the Red River, from Pembina to Stinking River, have been eaten up, excepting, in some instances, a portion of the wheat and potatoes have escaped.

"WINNIPEG.—The gardens in this city, and the oats and barley in the neighbourhood, are being destroyed. During the evenings, at the going down of the sun, they seek the board fences and sides of houses in such numbers that in many cases it is impossible to distinguish the colour of the houses, or the material of which they are built."

As yet we do not know whether the Locust ravages are wont to extend over the great fertile region to the north-west of Manitoba—that magnificent agricultural region drained by the Saskatchewan River; we hope, and we are strongly inclined to think, that the plague, if noticeable at all, is there trifling in character and moderate in extent. Should it be otherwise, should that "fertile belt" be as subject to these visitations as the States to the south of it unhappily are, it must prove a great hindrance to its rapid settlement. If, on the other hand, it possesses an immunity not shared in by the Western States, it will certainly draw from them, before many years are over, and as soon as railway facilities are afforded for transportation of goods and produce, a very large portion of those settlers who are now eaten out of house and home. We fully expect to see the tide of immigration which for a few years past has been setting so strongly towards the plains of Kansas and Nebraska, turned towards our own more highly-favoured, even though more northern regions of Assiniboine and Saskatchewan.

DESCRIPTION OF THE INSECT.

Let us turn now to a description of the insect respecting whose powers of destruction we have heard so much. As we have already remarked, there is very little difference in appearance between our common "grasshopper" and the famine-producing Locust of the West. They both belong to the same genus (*Caloptenus*) of the family Acrydidae and of the order of Orthoptera—straight-winged insects. The Acrydidae, or Locusts, are distinguished from their kindred, the true grasshoppers, by the following characteristics:—The former have short antennæ (or feelers), never exceeding the body in length; the latter have very long thread-like antennæ. The tarsi, or feet, of the former are three-jointed; of the latter four-jointed. The female of the former has the tip of the abdomen furnished with four very short

bony pieces, two of which curve upwards and two downwards (they may be observed in figures 33 and 34) ; the female of the latter has a long curved, often sword-shaped, ovipositor. The former, again, live upon the ground ; the latter for the most part on grass and trees.

All Orthopterous insects—including, of course, those we are now treating of—undergo what is termed an incomplete metamorphosis—that is to say, their larvæ and pupæ resemble all along the perfect insect, except that the wings are not fully developed and the size of the mature insect is not attained. To make our meaning clearer, we may mention that Lepidopterous insects (butterflies and moths) undergo a perfect or complete metamorphosis ; as every one knows, the caterpillar, or larva, is totally different from the winged insect, while the chrysalis or pupa is entirely different from either. In food, habits and appearance, the insect undergoes a complete change at each metamorphosis. In the case of Locusts, on the contrary, one can hardly say with certainty when the larval state ends and that of the pupa begins ; or when, again, the pupal condition merges into that of the perfect insect.

The genus *Caloptenus*, to which we are now confined, is represented almost all over the world. In North America eight different species have been described by entomologists, but we are inclined to think that some of these are little more than varieties of others. Three species only are prevalent in large numbers—viz., *C. spretus*, *C. femur-rubrum*, and *C. bivitatus* ; the last mentioned does not occur in Canada, so far as we are aware, and is of small importance economically as compared with the other two. We are thus reduced to the two species that we spoke of at the outset : our common red-legged Locust, or “grass-hopper” (*Caloptenus femur-rubrum* Burm.), represented in figure *b* ; and the hateful Locust (*C. spretus* Uhler), figure *a*.

FIG. 33.



The reader will observe that there is but a very slight difference in appearance between the two species. The left hand, our common species, only dif-

FIG. 34.



fers, one may say, from its most destructive fellow on the right, by its having shorter wings. It is owing to this difference in length and expanse of wing that the one species is confined to the neighbourhood where it was born, while the other rises aloft into the air, and is literally “borne upon the wings of the wind” to regions far away from its place of birth.

As the Red-legged Locust must be so familiarly known by every one—during most summers, indeed, it is hardly possible to walk a few yards in the open air without startling numbers into flight—and as it is fairly represented in the above figure (*b*), we may content ourselves with quoting the following brief description by Dr. Harris. The insect is “grizzled with dirty olive and brown, a black spot extending from the eyes along the sides of the thorax ; an oblique yellow line on each side of the body beneath the wings ; a row of dusky, brown spots along the middle of the wing covers ; and the hindmost shanks and feet blood-red, with black spines. The wings are transparent, with a very pale, greenish-yellow tint, next to the body, and are netted with brown lines. The hindmost thighs have two large spots on the upper side, and the extremity black ; but are red below, and yellow on the inside. The appendages at the tip of the body in the male are of a long triangular form. Length from three quarters of an inch to an inch ; expansion of the wings from $1\frac{1}{4}$ to $1\frac{3}{4}$ of an inch.”

The Hateful Locust (*C. Spretus*), figure *a*, can scarcely be distinguished in colour or general appearance from the foregoing species ; the principal difference, as already stated, is in the length of the wings. In this species they are about one-third longer than the body of the insect ; they are quite transparent with slightly dusky nerves, and when seen high up in the air against the sun, have the appearance of large snow-flakes. The eggs are deposited in the ground, in a cocoon-shaped mass, covered with a tough, glutinous secretion, and vary in number from fifty to a hundred. They are laid in the latter part of the summer and remain in their place of deposit until the following spring ; usually they hatch out in March, making their appearance with the earliest vegetation of the locality. There is a good deal of difference of opinion with regard to the head-quarters of this insect ; many writers affirm that all the swarms comes from the cañons of the Rocky Mountains ; others again, and with more reason, we believe, hold that they breed throughout all the mountain valleys and plains of the west, but chiefly in those vast tracts of uninhabited country, lying on the slopes of the Rocky

Mountains in Arizona and New Mexico ; they breed also, there can be no doubt, in the regions that they invade, but owing to differences of climate, these broods do not always mature. They delight most in a very dry, hot atmosphere.

Like many other species of Orthoptera, the males produce sounds by means of an apparatus that may be "likened to a violin, their legs being the bows, and the projecting veins of their wing-covers the strings. When a locust begins to play, he bends the shank of one hind leg beneath the thigh, where it is lodged in a furrow designed to receive it, and then draws the leg briskly up and down several times against the projecting lateral edge and veins of the wing-cover. He does not play both fiddles together, but alternately, for a little time, first one and then the other, standing meanwhile upon the four anterior legs and the hind leg which is not otherwise employed." (Harris.) When in flight, the swarm produces a loud pattering sound, which as Dr. Thomas remarks, is probably due to the beating of the air by the wings, as it is not confined to the male sex. If any of our readers are curious upon the subject of insect music, they will find an interesting paper upon "the Songs of the Grasshoppers," by our much esteemed friend, Mr. Scudder, in the *American Naturalist* (vol. 9, page 113); in it not only is the apparatus described, but the notes are set to music, and no doubt can be sung by any accomplished vocalist!

Before closing this portion of our remarks, we would acknowledge our indebtedness, and call attention, to the admirable "Synopsis of the Acrididæ of North America," by the Rev. Cyrus Thomas, Ph.D., published by the Government of the United States as a portion of Dr. Hayden's Report on the U. S. Geological Survey of the Territories. It is magnificently printed in quarto form, and is a complete monograph of the family. We take this opportunity of thanking Dr. Hayden for his courtesy in favouring us with a copy.

MEANS OF REDUCING THE RAVAGES OF THE LOCUSTS.

When a species of insect comes in countless millions suddenly, without any forewarning, upon a locality hundreds of miles away, it may be, from its place of birth, and devours in a single day every green thing upon the surface of the country, it seems almost impossible to suggest any remedy. Something, however, may, we believe, be done, but any measure to be in the least degree efficacious must be adopted universally over a large area of country. Before considering any method of combatting the plague, we must mention one remedy that has been received by the press with some degree of amusement, though gravely propounded by the editors of the *American Naturalist*. After referring to the destitution in Minnesota and the application from its State authorities to the general government for aid, they put the question:—

"Why should not the grasshopper be eaten in turn?" Why not, indeed? For, as they state, "the grasshopper, or locust of the East, is universally eaten in portions of Africa and Western Asia, and pronounced a nutritious and palatable article of diet by Arab chiefs as well as Hottentot savages. They are eaten roasted whole, minus the legs, or roasted and powdered. We would recommend that experiments be made as to the best modes of preparing the locust for food. They should be thoroughly cooked to guard against parasitic worms. Not willing to urge the use of grasshoppers as food for others, without first eating them ourselves, we may say that we have found the grasshopper, first killed by boiling water, and then fried in butter, at least as palatable as many articles of food eaten by civilized people; and to people actually famishing, as is said to be the case in Minnesota, it will be worth their while to avail themselves of a food stuff which millions, perhaps, of people in other lands regard as wholesome."

In corroboration of this use of the locusts, we may add, that Dr. Livingstone speaks highly of the locust as an article of food in Africa, and considers them superior to shrimps. Honey, when it can be obtained, is often eaten with them, and, while improving the flavour, renders them more digestible. We need hardly remind our readers that this was the food of St. John the Baptist in the wilderness. The ancient historian, Herodotus, relates that locusts are used for food, being first dried in the sun, than reduced to powder, and drunk in milk. In his well-known work, on South Africa, Cumming states that "Locusts afford fattening and wholesome food to man, birds and all sorts of beasts; cows, horses, lions, jackals, hyenas, antelopes, elephants, &c., devour them. Our hungry dogs made a fine feast on them. . . . We roasted a quantity for ourselves and our dogs." Kirby and Spencet

(People's Edition, page 173,) state that, "as locusts are the greatest destroyers of food, so as some recompense, they furnish a considerable supply of it to numerous nations." After quoting a number of authorities for this statement, they add that "they are preferred by the Moors to pigeons; and a person may eat a plateful of two or three hundred without feeling any ill effects. They usually boil them in water half-an-hour (having thrown away the head, wings and legs.) then sprinkle them with salt and pepper, fry them, adding a little vinegar." We trust that the editors of the *Naturalist* will try this recipe next summer! Among the food products of the North American Indian (Report of Agricultural Department, Washington, 1870,) we find enumerated grasshoppers or locusts, which are eaten by the Diggers of California and the Plains. They roast them in holes in the ground and mix them with powdered acorns; sometimes they make of them a soup or mush. Mr. Taylor, however, (Smithsonian Report, 1858,) referring to the same custom, declares that this kind of food is always found to sicken the Indians, and that this result is vouched for by the early settlers and the natives, and also by many travellers and voyagers who have visited California and the Rocky Mountain country, and by the Jesuits of Lower California. From these statements we may infer that the locusts on the western side of the Rocky Mountains, considered to be a distinct species from the *C. spretus* of the eastern side, are unwholesome, but it remains to be proved that a nutritious article of diet may not be obtained from the latter. Certainly, it is an experiment worth trying; if successful, we should have a double benefit—the lessening of the numbers of the locusts, and a supply of food wherewith to meet the famine that they have produced. Such a fate for the invaders would be true poetic justice.

In the Smithsonian Report for 1858, to which we have already referred, there is an interesting article, translated from the Russian of V. Motschulsky, in which much valuable information is afforded respecting the mode of dealing with locusts in Southern Russia and other neighbouring countries with regard to natural remedies. He states that "whole generations of them succumb to the climatic influence of those countries to which, impelled by hunger, they betake themselves. Winds and storms not unfrequently cast vast swarms of them into lakes and seas, and other millions perish in crossing rivers. Frogs, lizards and various birds, especially of the starling, blackbird, lark, crow, jackdaw, stork and other species devour them with great avidity. Domestic fowls, as geese, ducks, turkeys and chickens are exceedingly fond of such food." Among insects several species of ichneumons (Hymenoptera) destroy them both in the egg and larval states. He concludes that "of the eggs laid by the locusts about one tenth only succeed in passing through all the transformations of their existence, and with this tenth part alone it comes in contact with the husbandman. But even this is sufficiently great to furnish matter for reflection to every one who knows by experience what an attack of locusts is."

After describing a large number of artificial modes of contending against the locusts, some of which are quite useless, and others more or less successful, he draws up a number of general conclusions. Those at all applicable to North America we shall quote, with a few remarks upon them.

(a) "It is necessary to observe in the autumn, especially after a hot summer, where the locusts have deposited their eggs, and to accustom persons appointed for the purpose to do so." Much might, we think, be done in this way both by the State authorities in the west, by municipalities and by individuals.

(b) "As soon as the labours of tillage will permit, people should be sent out in the fall to collect the locusts' eggs, provided with instruments for turning up the ground. If the eggs are deposited where ploughs and harrows can pass, these should be made use of. The egg-tubes of the locusts should be poured into sacks, and either measured or weighed, and a suitable award paid for the amount collected, so as to stimulate numbers to busy themselves in this useful labour." If a certain price per bushel or hundred-weight were offered for the egg-cases by the various local authorities in the regions affected, not only would the numbers of the locusts be greatly reduced, but remunerative employment would be afforded to those who have been suffering by their ravages. In many places the locusts deposit their eggs where they have just ravaged the fields, consequently the inhabitants will not have far to go in order to find the germs of the next year's trouble. It would be desirable, too, that well-equipped expeditions of competent persons should be sent out to explore the regions bordering on the Rocky Mountains, from which the swarms emanate in the first instance.

(c) "All the places where locusts' eggs are found should be ploughed over, if possible,

two or three times very late in the autumn. Special attention should also be given to bar-spots in the fields, where not unfrequently great quantities of egg-tubes may remain unobserved." This plan of deeply ploughing under the eggs of the grasshoppers, or of ploughing them up so as to expose them to all the changes of the weather, has been found very effective in Mani-toba and other places.

(d) "Breeding large quantities of domestic fowls and training them to feed on young locusts, is exceedingly advantageous to the husbandman." Geese, chickens, turkeys and guinea-fowl are especially mentioned. This plan would be of very slight use as a protection against the migrating swarms of locusts, but it might be of some little value in places where they breed. It is well known that a large brood of turkeys is invaluable to a farmer where the common red-legged locust abounds.

(e) If the locusts settle anywhere in a thick mass, large numbers may be destroyed in the evening, when they are quiet, by means of heavy iron or wooden rollers drawn by horses or oxen. This method might be of some slight advantage if generally adopted, but usually, by nightfall, most of the damage is done.

A large number of other methods are mentioned, but they are entirely inapplicable to the vast and thinly populated regions of the west.

A remedy is much employed, on the other hand, in America which could not be made use of in Russia, viz., fire. It is only during dry and very hot weather that the invasions take place. When a swarm has once alighted and has commenced the work of destruction it is often practicable to set fire to the fields and crops in places and thus kill or drive away the destroyer. In this case the remedy is almost as bad as the disease, but yet it has been adopted in many instances with good results.

Noises made by trumpets, guns, cannons, &c., sometimes drive away a small body of locusts, but they are utterly useless when the invasion takes place on a large scale.

On the whole, it seems as if man can do but very little to ward off the attacks of this fearful scourge. Still it is proper that every effort should be made to find out the exact habits of the insect, and the particular localities from which it emanates; it is fitting, too, that no means should be left untried that affords any prospect of lessening the destruction that they occasion. The Arabian fable we cannot but feel, has much truth at the bottom of it; they represent a locust as saying to Mahomet, "We are the army of the Great God; we produce ninety-nine eggs, if the hundred were completed we should consume the whole earth and all that is in it." While the people of the West are in the hands of Providence to protect them from such mighty armies as these, they can best help themselves by going to the root of the evil—that is to say, by reducing to the utmost extent the numbers of eggs that are laid for future broods.

After all the accounts that we have given of these insects, we feel that nothing can equal in sublimity and correctness the description afforded by the Prophet Joel, ii. 2—11.

"A day of darkness and of gloominess, a day of clouds and thick darkness, as the morning spread upon the mountains: a great people and a strong; there hath not been ever the like, neither shall be any more after it, even to the years of many generations. A fire devoureth before them and behind them a flame burneth: the land is as the garden of Eden before them, and behind them a desolate wilderness; yea, and nothing shall escape them. Like the noise of chariots on the tops of the mountains shall they leap, like the noise of a flame of fire that devoureth the stubble; as a strong people set in battle array. Before their face the people shall be much pained; all faces shall gather blackness. They shall run like mighty men; they shall climb the wall like men of war; and they shall march every one on his ways, and they shall not break their ranks, neither shall one thrust another, they shall walk every one in his path, and when they fall upon the sword they shall not be wounded. They shall run to and fro in the city, they shall run upon the wall, they shall climb up upon the houses, they shall enter in at the windows like a thief. The earth shall quake before them, the heavens shall tremble, the sun and the moon shall be dark, and the stars shall withdraw their shining, and the Lord shall utter His voice before His army, for His camp is very great, for He is strong that executeth His Word, for the day of the Lord is great and very terrible, and who can abide it?"

While the foregoing paper was passing through the printer's hands, we cut from the *Albany Country Gentleman*, the following official statement of the misery caused by the plague of

Locusts in the Western States, which fully corroborates any expressions that we have used above:—

“THE WESTERN GRASSHOPPERS.—Commissioner-of-Agriculture Watts has issued a synopsis of information received concerning the extent of suffering from the grasshopper plague, which we copy, somewhat condensed:

“*First.*—The area of this visitation comprises a zone 200 to 225 miles wide, extending from the settlements of Southern Dakota, through Nebraska and Kansas, over 500 miles in length, and inclining to south. A few western counties of Iowa and Minnesota report injuries. The extent of territory visited by these insects in 1874 very considerably exceeds 100,000 square miles.

“*Second.*—The grasshopper district west of Missouri embraces population of Kansas, Nebraska and Southern Dakota, amounting to over 500,000 in 1870, with a large increment since. Including counties east of the Missouri in Iowa and Minnesota more or less affected by the plague, I think it not extravagant to assign 750,000 as the approximate population of these districts.

“*Third.*—In Kansas, cases of total destitution in 50 counties reported vary from 40 to 2,000; reports from counties not in this list show injuries as severe as in any others. The average of such cases 555 in each county. These do not include cases of partial destitution, which, in some counties are quite large, ranging from 26 to 1,000. The cases of total and partial destitution in these 30 counties amount to over 40,000, while in other counties there are, probably, cases unreported sufficient to swell the aggregate to 50,000. In the more thinly populated counties of Nebraska and Dakota the number of such cases is, of course, smaller. Adding the cases east of Missouri, I do not think it out of the way to estimate the number of people affected by this pest at 75,000 to 100,000.”

ON SOME INJURIOUS INSECTS.

BY W. SAUNDERS, LONDON, ONTARIO.

THE CODLING MOTH (*Carpocapsa pomonella*, LINN).
THE PEAR TREE SLUG (*Selandria cerasi*, PECK).

THE CODLING MOTH (*Carpocapsa pomonella*, LINN).

This is, indeed, one of the most troublesome insects with which we have to contend, and one of the most difficult to deal with, and, although of foreign introduction, has spread over the greater part of our country entailing a yearly loss on our apple crop which it would be difficult to over estimate. We shall briefly give the various features in its life history with a cut illustrating the insect as it appears in its various stages, and then detail such measures as have been suggested with a view to its destruction.

Fig. 35.

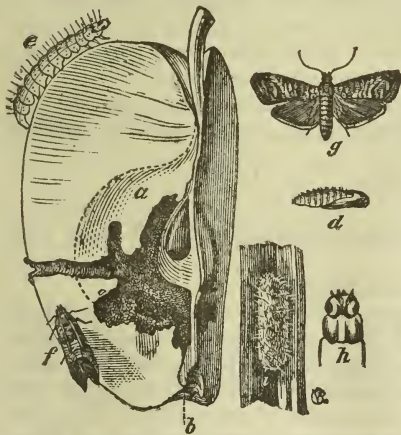


Fig. 35 represents a section of an apple which has been occupied by a codling worm—*b* shews the point of entrance of the young worm, the place of exit of the matured larva being shown at the left hand side of the figure; *e*, the full-grown worm; *h*, its head and first segment magnified; *i*, the cocoon; *d*, the pupa removed from the cocoon; *f*, the moth with wings closed; *g*, the same with wings expanded.

Soon after it leaves the fruit in the fall, the larva selects some secluded of nook or cranny, under loose bark of tree or other convenient hiding place, and there spins its tough papery-looking cocoon, and within this secure retreat it remains in the larval condition until early in spring, when, a few weeks before the final change takes place, it enters the chrysalis state. It seems strange that this tiny creature should be endowed with such a power of varying the length of its larval existence, that at this season the larva should remain so long unchanged, while, in the case of the earlier summer brood, the change to chrysalis takes place almost immediately after the spinning of the cocoon. About the time of the opening of the apple blossoms this insect bursts its prison house and appears as a winged moth. See Fig. 35, *g*.

The moth deposits her eggs singly, and usually in the calyx or eye, just as the young apple is forming. In about a week the larva is hatched, and at once the tiny worm begins to eat its way through the apple to the core. Its castings are commonly pushed out through the hole by which it has entered, which is from time to time enlarged for the purpose; these usually adhere to the apple, so that, before the worm is full grown, infested fruit may generally be detected by the mass of reddish-brown exuviae protruding from the eye. Sometimes, as the larva approaches maturity, it eats a passage through the apple at the side, and out of this opening its castings are thrust, and here the mature worm escapes when full grown. The occupied apple generally falls prematurely to the ground, sometimes with the worm in it, but

more commonly after the worm has escaped. The larvæ which leave the apples while still on the trees, either crawl down the branches to the trunk of the tree, or otherwise let themselves down by a fine silken thread, which they spin at will, to the ground; in either case, the greater portion of them take refuge under the rough loose bark on the trunk of the tree, and there spin their cocoons. The second brood of moths appear from about the twentieth to the last of July. We have taken them on the wing at night as early as the nineteenth, but specimens confined in breeding boxes, have not, as a rule, made their appearance until about the end of the month. In the winged state they seldom live more than a few days, and in this brief space they pair, and the female deposits her eggs for the second brood of larvæ, and, for this purpose, wisely shows a preference for the later apples. The codling moth also attacks the pear, in some localities, most disastrously for the crop; the fruit, however, seldom falls to the ground until some time after the worm has left.

Dr. Wm. Le Baron, State Entomologist, of Illinois, has devoted much time and attention to the study of the history and habits of this insect, and has published in his last annual report an excellent paper on this subject. Mr. Riley, of St. Louis, has also made observations and experiments on this same insect, which corroborate those of Dr. Le Baron, these are referred to in the fifth and sixth annual reports on the noxious, beneficial and other insects of the State of Missouri; from both these sources we shall glean and make free use of such facts as we think will interest our readers.

The number of eggs each moth is capable of laying will, probably, average not less than fifty, but these are not all matured at once, but may be found, by careful dissection of the body of the moth, in various stages of development. Hence they must be deposited successively, the period probably extending over a week or more.

REMEDIES.

This is an all important matter in which, in this instance, man must rely chiefly on his own efforts, for although, doubtless, a large number of the worms and chrysalids are annually destroyed by birds, and another limited portion by parasitic insects, still from the advantageous shelter afforded them by the apple, and the fact of their movements after leaving it being mostly in the night time, the codling worm enjoys much immunity from natural foes.

Dr. Le Baron divides this practical portion of the subject, as far as man's work is concerned, into four heads, and here we cannot do better than quote from his excellent paper:—

“1st. Destroying the insects in their winter quarters.

“2nd. Picking the wormy apples from the trees.

“3rd. Gathering the wormy apples from the ground, or letting swine and sheep have the range of the orchard.

“4th. Entrapping the worms in bands and other contrivances.”

1st. *Destroying the insects in their winter quarters.*—When we consider that each female moth is capable of laying fifty eggs or more, and that every worm of the first brood ruins an apple, we can see the importance of destroying these insects before they leave their winter quarters. We have already mentioned that in the state of nature, these worms pass the winter in cocoons, concealed under the bark, or in the crevices of apple trees. The summer brood of worms, which remain but two weeks in the pupa state, sometimes content themselves with a very slight protection, but it is the nature of the insect to seek deep concealment, and the instinct of the second brood, which is to survive the winter, leads them to search for the deepest protection they can find. We, therefore, rarely find them under shallow and loose scales of bark, but very often in deep cracks and crevices, partially embedding themselves in the substance of the wood or bark. Any superficial scraping of the trees, or whitewashing, or other outward applications would not, therefore, be likely to reach many of them; and inasmuch as they may be hidden upon any part of the trunk or large branches, any attempt to discover them with the intention of digging them out would, evidently, be impracticable; but at the point where we become powerless the woodpeckers come to our aid. In their search for just such hidden worms as these, those busy foragers unite business with pleasure, and all through the wintry day the sharp rattle of their beaks may often be heard in the orchard, as with ear intent and sharpened beak, and appetite not less sharp, they pursue their hidden prey with unerring and fatal precision.

"A more efficacious way of destroying these worms as far as our own instrumentality is concerned, is to search for them about the barrels and bins in which fall and winter apples have been kept. I have heard of instances where the sideboards of the bins have been taken away from time to time, as the apples were removed and thrown one upon another, in which these boards became so fastened together by the webs of the worms between them, that a number of boards could be raised by taking hold of the upper one only. There can be no doubt that the destruction of the codling-worm at this stage of its existence, would be very effective, and that it has been by far too much neglected."

Our esteemed President, Rev. C. J. S. Bethune in his remarks on this subject in our report for 1870, says "a very favourite locality for these worms is the space between the hoops and staves of the barrels. We have found hundreds in such positions especially in the winter of 1868-9. Where this occurs it is by all means worth while to scald the barrels thoroughly outside as well as inside, as soon as they are emptied or even to burn them. When boxes or bins are made use of for storing the fruit, the worms are sure to find some crevices to suit them, which should be searched for, and treated as in the case of the barrels."

2nd. *Picking the wormy apples from the trees.*—We have stated above that the young worms, soon after they have entered the apple, begin to throw out their castings through the hole which they made in entering. As this hole must be originally almost microscopically minute, it is evident that they must enlarge the opening for this purpose. We further stated that a portion of the castings adhere to the rough and shrivelled calyx, forming a rust coloured mass, which is easily seen from the ground below. Some horticulturists have availed themselves of this circumstance for the purpose of removing the wormy apples from the trees before the worms have escaped. The plan is to beat off the wormy apples, or else pick them off by means of a wire hook attached to the end of a pole. These two methods can be very usefully combined by first jarring or beating off those apples which readily fall, and then going over the trees a second time with the pole and hook. The apples thus removed should of course be fed to swine, or otherwise treated so as to destroy the worms within. Too much value cannot be attached to these simple expedients, which in the case of a few choice trees, or even a small orchard, might almost be made to supercede the necessity of any other treatment."

"3rd. *Gathering the wormy wind-fall apples from the ground, or letting swine or sheep have the range of the orchard.*—This plan has been generally recommended as of very great importance. Its efficacy will depend, of course, upon the proportion of worms which fall to the ground in the apples, as compared with those which leave the apples whilst hanging upon the tree. Those which crawl down the branches spin up before reaching the ground, and those which let themselves down by a thread, would, for the most part, be detected only by birds or by domestic fowls, and as there is reason to believe that they usually perform this act in the night, even these must fail to capture them."

"With regard to those wind-falls which contain worms, it is necessary to gather them frequently, that is every day or every second day at farthest. The apples do not usually fall until the worms are nearly matured, and they leave them in the course of a few days. If you examine indiscriminately a large number of wind-fall apples lying under the trees, you will be surprised to find how few worms they contain, they evidently having left the fruit before it fell, or soon after."

"But the most important question in this connection is, what proportion of the worms leave the apples before they fall from the tree? I have endeavoured to arrive at an approximate estimate upon the subject by putting two or more bands upon the same tree, upon the presumption that the worms descending from above will spin up in the upper band, and those crawling up from the ground in the lower. The following tables numbered for the purpose of reference give the results of these experiments. The wind-fall apples were left in every case as they fell upon the ground."

"On the tenth of July, 1871, I put bands as follows, upon four trees, the ground underneath being bare, or free from grass or rubbish of any kind. One band was put about a foot from the ground, another about two feet higher on the trunk, and others on two or three of the larger branches, eight or ten feet from the ground. They were examined July 28th, eighteen days after they were put on."

No. 1.

Whole number of worms in all stages.....

220

Number of empty pupa cases	28	
Number of pupæ.....	127	
Number of enclosed but unchanged larvæ.....	55	
	—	220
Number of all stages in lowest bands.....	94	
Number of all stages in upper trunk bands.....	83	
Number of all stages in bands on limbs.....	43	

No. 2.

(Same trees examined August 11th, two weeks later.)

Number of pupa cases.....	16	
Number of pupæ.....	24	
Number of larvæ.....	15	
	—	65

Of these there were in lowest bands 21, middle or upper trunk 13, and on limbs 31.

No. 3.

(Same trees August 25th, two weeks from last.)

Number of pupa cases.....	1	
Number of pupæ.....	4	
Number of larvæ unchanged.....	41	
	—	46

Distributed as follows, in lowest bands 24, middle or upper trunk 15, in bands on limbs 7.

No. 4.

(Same trees September 9th, fifteen days later. Found larvæ only.)

Number in lowest bands.....	33	
Number in middle bands	39	
Number in bands on limbs.....	9	
	—	81

No. 5.

(Same trees September 23rd, two weeks later. Larvæ only.)

Number in lowest bands.....	28	
Number in middle bands.....	22	
Number in bands on limbs.....	4	
	—	54

"On the fourth of July, 1872. I selected a smooth thrifty apple-tree, six inches in diameter, growing upon grass land, and well filled with apples, bearing many marks of being wormy, but remarkably tenacious, and consequently but few lying upon the ground. Put two bands upon the trunk, one a foot and a half above the other.

"Examined July 23rd, a moderate number of apples having in the meantime fallen upon the ground.

Whole number in the lower band	150	
Whole number in the upper band	110	
	—	260

"The bands in this experiment were made of carpet six inches wide, and long enough to go twice around the tree, making a very abundant covert for the worms. As might have been anticipated, in this case the greater part of the worms in the upper band were found in its upper half, indicating that the worms had reached it by descending from above; and on the other hand, the greater part of the worms in the lower band were in its lower half, showing that they had come up from the ground. We say the greater part, but not all, implying that some worms in each case had passed over one band and gone on to the next."

The above tables furnish data for many interesting and practical deductions.

"First, as respects the question now under consideration, namely, what proportion of the worms leave the apples before they fall from the tree; if we add together all the worms found in the highest and the lowest bands respectively, and divide those in the middle or upper trunk bands equally between the other two, we shall have 436 in the lower bands, and 290 in the upper, implying at first view that much the larger number came up from the ground. But there are several circumstances in these experiments which must be taken into account, and which will somewhat modify this conclusion. First, many of the limbs have no bands upon them, and the worms from these may be presumed to have found covert chiefly in the upper bands on the trunk. Second, two of the trees experimented upon were large rough trees, and a part of the worms undoubtedly spun up under the scales of bark on the limbs above the bands. And thirdly, we do not know what proportion of the worms may have let themselves down to the ground by threads, and thus found shelter under the lowest bands. Taking these circumstances into account, we shall perhaps arrive at an approximation sufficiently accurate for practical purposes, if we divide the whole number of worms equally between the upper and lower bands, from which we infer that about half the worms crawl down the tree, and the other half reach the ground either in the apples or by threads. We must infer from this as far as one series of experiments enables us to judge, that the gathering of wind-fall apples, either by ourselves or by the aid of domestic animals, enables us to destroy less than half of the codling worms.

"The animals used for this purpose are hogs and sheep, the latter are more cleanly, and equally effective, but they are liable to damage young trees by gnawing the bark."

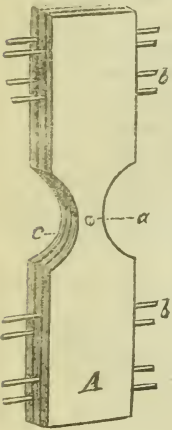
4th. *Entrapping the worms under bands, &c.*—Our own experience in a series of experiments, very similar to those above detailed, was much the same, excepting in the number of larvæ captured, which from five trees did not, at any one time, exceed 47, the distribution in the upper and lower bandages being nearly in the same proportion as that given by Dr. Le Baron. This method of entrapping the worms under bands is without doubt the most effective remedy yet devised, and if it were generally and persistently followed would effect a large yearly saving in the crop of this valuable fruit. It is of great importance that united effort should be made in this case, as the evil is an increasing one, and the yearly loss now entailed something enormous. With us we have known the full-grown larva to be found under bandages as early as the 4th of July, hence we think that their application should not be delayed later than the 1st. Indeed it would be wise to apply them a few days earlier than this. By referring to the first and second captures in Dr. Le Baron's first experiment, it will be observed that quite a number of empty pupa cases were found, 54 in all, showing that sufficient time had elapsed before examination to allow of the larvæ passing through the stage of chrysalis, and escaping as a perfect insect to continue its work of destruction. To prevent escapes of this sort we should recommend that the bandages be examined every ten days until the latter end of August. After this, worms of the second brood only will be found, and since these remain in the larval state until the following spring, the bands subsequently might be examined at leisure.

As to the material to be used for bandaging we have found old sacking, (which can often be obtained at trifling cost), to answer a very good purpose, cut into strips from six to eight inches wide, and long enough to go two or three times around the tree, and tied in the middle with a piece of stout twine. Strips of old carpet or cloth where they can be obtained, would, of course, prove equally good. In the excellent report of the Michigan Pomological Society, for 1873, we find that much interest is being excited throughout that State in reference to the codling moth, and many practical discussions are reported on the best means of fighting it, all however, agreeing in recommending the use of bandages. One apple grower recommends a bandage of common brown paper tied around the tree with a string; another while recommending the paper thinks the string too much trouble, and advises the use of a tack to fasten the end of the bandage with. One advantage claimed for this material for bandaging is that birds

readily find the hiding places of the larvæ, pierce through the thin covering and capture the worms, thus employing the efficient aid of our feathered friends in this useful work. One gentleman is reported to take no trouble to remove his paper bandages, merely securing them to the tree and allowing the birds to do the capturing, replacing the paper only when it is torn to shreds. Another prefers to use bands of cloth four inches wide, fastening the end with a tack, he usually finds all the worms by simply turning the edges of the cloth up and down without taking off the band. Still another thinks all strings and tacks a bother, and fastens the bandage quite securely by merely tucking the end under.

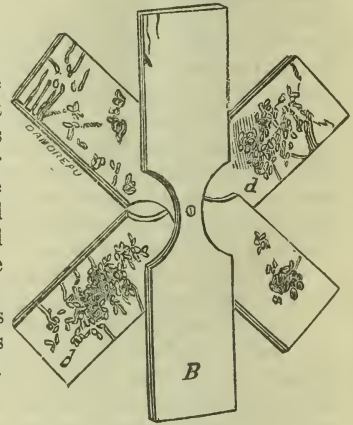
With reference to the economy of paper bandages, Mr. Riley in his fifth annual report, thus writes, "common straw paper 18 x 30 can be bought for 60 cents per bundle. Each bundle contains 240 sheets, and each sheet folded lengthwise thrice upon itself, will give us eight layers between two and three inches wide, and be of sufficient length to encircle most ordinary trees. It is easily drawn around the tree and fastened with a tack, and so cheap that when the time comes to destroy the worms, the bandages containing them may be detached, piled in a heap and burned, and new ones attached in their place. If eight bandages are used to each tree during the season the cost will be just two cents per tree."

Fig. 36.



Wier's shingle trap, (see Figs. 36 and 37, 36, the trap closed, 37, the same opened), has also been recommended, it is made usually of three pieces of old shingle about a foot long, and from four to six inches wide, fastened together and then nailed or screwed to the tree. In arranging the pieces the narrower ones should be placed next to the tree; it is also recommended to put a few bits of straw between the shingles so as to keep them slightly apart, experience, however, teaches that this trap is not so efficient or convenient as either of the bandages already referred to.

Fig. 37.



BRIEF SUMMARY.

While all other available means tending to the lessening of the numbers of the codling moth worms should be unhesitatingly employed, the chief reliance should be placed on the bandages, use strips of cloth, old carpet or sacking where these can be had, but if these materials are not readily procurable use paper or cotton. Bandages should be from four to eight inches wide and either fastened with a string or with a tack at the end, and will be all the better if long enough to go twice around the tree; they should be fastened about half way up the trunk of the tree some time during the latter part of June, and be examined every ten days from the first of July until the last of August and at least once after the crop is secured. Care must be taken in unwinding the bandages to prevent the worms from escaping by dropping to the ground, which they readily do when their cocoons are thus torn asunder. A common clothes wringer, to pass the bandages through, is one of the readiest and surest methods of destroying the worms; and in this way the bandages can be rapidly handled and re-applied. Be careful to scrape the rough bark off old trees so that the worms may not find suitable hiding places either in descending or ascending the trunk until they reach the bandage; attend to these instructions regularly and thoroughly, and try and induce all your neighbours to follow your example and rest assured that good results will attend united effort.

PARASITES RECENTLY DISCOVERED.

To Mr. Riley, of St. Louis, belongs the honour of being the first to discover true parasites affecting the codling moth worm, descriptions of which are given in his Fifth Annual Report (873). "Both of them are Ichneumon flies and the first may be called

"THE RING-LEGGED PIMPLA (*Pimpla annulipes*, BR.).

FIG. 38.



"This is a black fly, varying considerably in size, the female sometimes measuring but $\frac{1}{4}$, at others fully $\frac{1}{2}$ inch exclusive of ovipositor; the male somewhat smaller. The genus *Pimpla* was briefly characterized in my last report, p. 43, where it was shown that this same species attacks the walnut care bearer (*Acrobasis juglandis*, LEB). I annex a lateral outline of a female *Pimpla*, Fig. 38, the male has a more slender abdomen which is unarmed.

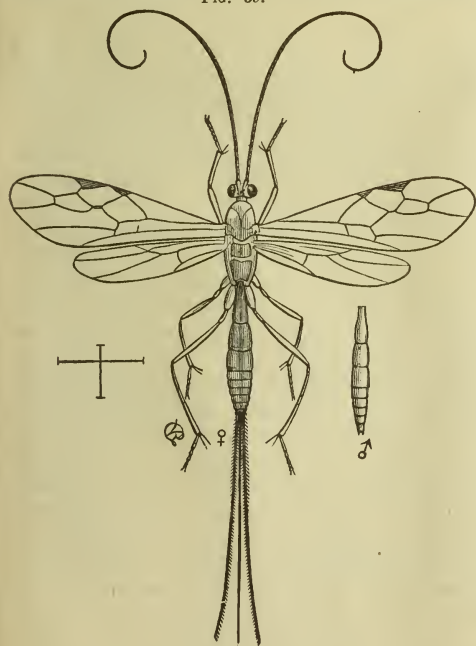
"*PIMPLA ANNULIPES* is black: the abdomen rough punctured above, with the borders of the joints polished and inclined to brown. The tegulae are white, and the legs are reddish, with the exception of the middle and hind tibiae, which are dusky—especially the hind pair—and have a broad white annulus, sometimes indistinct on the middle pair. The posterior tarsi are dusky, especially at tip. The palpi are pale yellow. Cresson says it may be distinguished from the other species of the genus, by the scutellum being black, the tegulae white, and the anterior coxae yellowish red.

"This fly eats its way through the chrysalis and the cocoon of the Codling Moth, without having previously made any cocoon of its own. It was quite abundant last summer as from one lot of *Carpocapsa* cocoons, I obtained 21 parasites—all of them females but one. It is a widely distributed and common species. The second parasite may be called the

"DELICATE LONG-STING (*Macrocentrus delicatus*, CRES.).

"It has recently been described by Mr. E. T. Cresson (*Trans. Am. Ent. Soc.* iv., p. 178), and is a somewhat variable species, occurring throughout the Eastern, Middle and Western, States, and in Mexico. I subjoin a description drawn up from my bred specimens.

FIG. 39.



"Male. Length 0.25; expanse 0.45; inch. Slender, colour pale, polished, honey yellow; uniformly and sparsely pubescent; tinged with brown superiorly, the basal joint of abdomen and a medio-dorsal line on the other joints being quite brown. Head, with the eyes (except at disc), and a spot between ocelli, brown-black; palpi long and almost white; antennae one-fourth longer than the whole body, about 48 joints, exclusive of bulbous, curled at tip, the ends of basal joints and the whole of joints dusky. Thorax, with the sutures well defined, and two small triangular black spots behind front tegulae, the metathorax strongly trilobed; legs very long, pale honey yellow, with tips of tibiae and tarsi faintly dusky; wings yellowish, hyaline and iridescent, with the veins luteous, and the stigma pale honey yellow.

"Female. Rather larger and with the abdomen somewhat paler, otherwise similarly marked. Ovipositor yellow, $\frac{1}{2}$ longer than body, the sheaths quite pilose, and inclining to fuscon. Described from 2 females and 1 male.

"It is a graceful fly with very long antennae and legs, and the female with a long ovipositor Fig. 39, "(the hair lines at the side of the figure show the natural size of the fly)."

The colour is pale honey yellow inclining to brown above. The unfortunate apple-worm is probably pierced while yet in the fruit, as it always succumbs soon after forming its cocoon,

and before changing to chrysalis ; while in the case of *Pimpla*, it is probably attacked either while leaving the fruit or after having spun its cocoon. The larva of the Delicate Long-sting forms, for itself, within the cocoon of its victim, a sufficiently tough, thin, oblong-oval, shiny, brown cocoon from which the perfect fly issues by cutting open a lid at one end.

"As both these parasites transform within the *Carpocapsa* cocoon, it is next to impossible and quite impracticable, to separate friend from foe in removing and destroying the contents of the bandages. But where it is desired to disseminate the parasites they may be bred by enclosing large numbers of *Carpocapsa* cocoons in some tight vessel."

On the 13th of August, 1873, we took a number of chrysalides of the Codling Moth under a bandage on an apple tree and among them there was one which was infested by *Icheumons*. The chrysalis when emptied was found to contain six of the parasitic larvæ of which the following description was taken. Length a little over one-tenth of an inch, body tapering almost to a point towards the head. Colour, dull, yellowish white with a tinge of yellow along the dorsal region, very transparent the internal organs showing plainly through. On each segment is a transverse row of short whitish spines, terminal segment encircled with stouter whitish spines. No proper feet or prolegs, but in moving, the mouth-parts attach first with a sucker-like disk and the hinder portions of the body are drawn gradually forward, different portions of the under surface bring furnished with small fleshy prominences which are attached and in turn withdrawn from the surface on which the larva is moving ; the principal points of attachment, however, seem to be the first and terminal segments, under the latter when viewed sideways, there appears a fleshy projection much larger than any of those on the other segments, and this projection expands into a flattened disk which holds the larva firmly to the place of attachment.

We did not succeed in rearing these larvæ ; after the chrysalis which contained them was broken open they, one after another died in spite of all our efforts towards their preservation. Whether this would have proved distinct from the species last described by Mr. Riley, and thus made a third true parasite on this pest we are unable at present to determine.

THE PEAR TREE SLUG.

Selandria Cerasi. Peck.

In the year 1790 Prof. Peck wrote a pamphlet entitled "Natural History of the Slug Worm," which was printed in Boston the same year by order of the Massachusetts Agricultural Society, and which obtained the Society's premium of fifty dollars and a gold medal. This, as far as we have been able to learn, was the first published record relating to the ravages of this insect in America. Forty-two years later (in 1841) Dr. Harris published his valuable treatise "On some of the insects injurious to vegetation in Massachusetts," in which when treating of this insect he gives the substance of Prof. Peck's remarks in a condensed form, portions of which material we shall avail ourselves of without further acknowledgement. Although seventy-five years have passed since Prof. Peck's memoir was written, but very little has been added during the interval to our common stock of knowledge in reference to this pest. In the meantime, however, it has spread over the whole country, damaging more or less seriously the foliage of our pear, cherry, quince and plum trees every year.

These insects pass the winter in the chrysalis state, the parent flies, the progenitors of the mischievous brood of slugs, appearing on the wing from about the third week in May until

Fig 40.



the middle of June. The fly (See Fig. 40) "is of a glossy black colour, excepting the first two pairs of legs, which are dirty yellow or clay coloured with blackish thighs, and the hind legs which are dull black with clay coloured knees. The wings are somewhat convex and rumpled or uneven on the upper side like the wings of the saw flies generally. They are transparent, reflecting the colours of the rainbow, and have a smoky tinge forming a cloud or broad band across the middle of the first pair ; the veins are brownish. The body of the female measures more than one-fifth of an inch in length, that of the male is smaller" Early in June these flies may be found resting in the early morning, or in the cool of the evening, on the upper or under side of the leaves of pear, cherry or plum trees, some seasons they are very plentiful, while at other times but few are met with. When jarring our plum trees for curculios at this season we usually find some on the sheets after jarring, they fall to the ground very

much like the curculio does, and remain for a short time motionless; their structure, however, is not such as will permit of their disguising themselves as thoroughly as the "little turk" does, and hence they are easily detected. During the past season these flies were very numerous during the early part of June, and their progeny was destructive in a corresponding degree later in the summer.

After pairing the female places her eggs singly within little semicircular incisions through the skin of the leaf, which is frequently followed by some discolouration at the point of insertion. Harris says that the eggs are generally placed on the lower side of the leaves, whereas in our experience we have found them quite as often on the upper side. According to the same author the flies all finish this business of egg depositing and disappear within the space of three weeks. "The flies have not the timidity of many other insects, and are not easily disturbed while laying their eggs. On the fourteenth day afterwards the eggs begin to hatch, and the young slug worms (see those on leaf in Fig. 41) continue to come forth from the fifth of June to the 20th of July, according as the flies have appeared early or late in the spring."

Fig. 41.



At first the slugs are white; but a slimy matter soon oozes out of their skin, and covers their backs with an olive-coloured sticky coat. They have twenty very short legs, or a pair under each segment of the body excepting the fourth and the last. When fully grown (See a Fig. 41) they are about nine-twentieths of an inch in length. The head which is of a dark chestnut colour is small, and is entirely concealed under the fore part of the body. They are largest before, and taper behind, and in form somewhat resemble minute tadpoles. They have the faculty of swelling out the fore part of the body, and generally rest with the tail a little turned up. These disgusting slugs live mostly on the upper side of the leaves of the pear and cherry trees, and eat away the substance thereof, leaving only the veins and the skin beneath untouched. Sometimes twenty or thirty of them may be seen on a single leaf; and in the year 1797 they were so abundant in some parts of Massachusetts that small trees were covered with them, and the foliage entirely destroyed, and even the air by passing through the trees, became charged with a very disagreeable and sickening odour, given out by these slimy creatures. The trees attacked by them are forced to throw out new leaves, during the heat of the summer, at the ends of the twigs and branches, and this unseasonable foliage which should not have appeared until the next spring, exhausts the vigour of the trees, and cuts off the prospect of fruit."

"The slug worms come to their growth in twenty-six days, during which period they cast their skins five times. Frequently as soon as the skin is shed, they are seen feeding upon it; but they never touch the last coat which remains stretched out upon the leaf. After this is cast off, they no longer retain their slimy appearance and olive colour, but have a clean yellow skin, entirely free from vicidity. They change also in form and become proportionally longer, and their head and the marks between the rings are plainly to be seen. In a few hours after this change they leave the trees, and, having crept or fallen to the ground, they burrow to the depth of from one inch to three or four inches, according to the nature of the soil. By moving their body the earth around them becomes pressed equally on all sides, and an oblong, oval cavity is thus formed, and is afterwards lined with a sticky glossy substance, to which the grains of earth closely adhere. Within these little earthen cells or cocoons the change to chrysalids takes place, and in sixteen days after the descent of the slug worms, finish their transformations, break open their cells, and crawl to the surface of the ground, where they appear in the fly form. These flies usually come forth between the middle of July and the 1st of August, and lay their eggs for a second brood of slug-worms. The latter come to their growth and go into the ground in September and October, and remain there till the following spring, when they are changed to flies and leave their winter quarters. It seems that all of them, however, do not finish their transformation at this time; some are found to remain unchanged in the ground till the following year; so that if all the slugs of the first hatch in any one year should happen to be destroyed, enough from a former brood would still remain in the earth to continue the species."

"The disgusting appearance and smell of these slug-worms do not protect them from the attacks of various enemies. Mice and other burrowing animals destroy many of them in their cocoons, and it is probable that birds also prey upon them when on the trees both in the

slug and winged state. Professor Peck has described a minute ichneumon fly, stated by Mr. Westwood to be a species of *Encyrtus*, that stings the eggs of the slug fly, and deposits in each one a single egg of her own. From this in due time a little maggot is hatched, which lives in the shell of the slug-fly's egg, devours the contents, and afterwards is changed to a chrysalis, and then to a fly like its parents. Professor Peck found that great numbers of the eggs of the slug fly, especially of the second hatch, were rendered abortive by this atom of existence.

Sand, ashes, lime and hellebore have been recommended as remedies for this pest but the last mentioned is by far the most reliable. In 1870 we tried some experiments with these remedies, and reported in the *CANADIAN ENTOMOLOGIST* for September of that year, as follows :—

THE PEAR TREE SLUG.

This disgusting little larva, the progeny of a little blackish sawfly, has been very abundant during the past season and has been the subject of some notes and experiments. In the first place we noted that there were two broods in the season. The parents of the first brood, which pass the winter in the chrysalis state, appear on the wing about the second or third week in May, depositing eggs from which the slugs are hatched, becoming full grown from the middle to the end of June, then entering the chrysalis state underground; the second brood of the flies make their appearance late in July. This year we noticed them at work depositing eggs on the 21st, the young slugs were abundant and about a quarter of an inch long on the eighth of August, and by the sixth of September many of them were full-grown. With us they were much more destructive to cherry trees than to pear, consuming the upper surface of the leaves, soon giving the trees a scorched and sickly aspect, and in many cases the foliage fell off, leaving the trees almost bare.

As soon as the slugs were observed at work in Spring, they were treated to a plentiful supply of dry sand, thrown up into the higher branches with a shovel, and shaken over the lower ones through a sieve, which stuck thickly to their slimy skins, completely covering them up. Thinking we must have mastered them by so free a use of this long trusted remedy, we took no further heed of them for some days, when to our surprise, they were found as numerous as ever. The next step was to test this sand remedy accurately to see what virtue there was in it. Several small branches of pear trees were selected and marked, on which there were six slugs, and these were well powdered over—entirely covered with dry sand; on examining them the next morning it was found that they had shed the sand-covered skin and crawled out free and slimy again. The sand was applied a second and third time on the same insects with similar results; and now being convinced that this remedy was of little value, they were treated to a dose of hellebore and water, which soon finished them. Ashes were now tried on another lot, the same way as the sand had been, with very similar results. It was also intended to try fresh air slacked-lime, which we believe would be effectual, but having none on hand just then, the experiment was postponed, and the opportunity of testing it lost for the season. We must not omit mention of an experiment with hellebore. On the 13th of August, at eight a.m., a branch of a cherry tree was plucked, on which there were sixty-four slugs; the branch had only nine leaves, so that it may be readily imagined that they were thickly inhabited. A dose of hellebore and water was showered on them about the usual strength, an ounce to the pailful, when they soon manifested symptoms of uneasiness, twisting and jerking about in a curious manner; many died during the day, and only six poor, sickly-looking specimens remained alive the following morning, and these soon after died.

During the past season these slug worms have been unusually abundant on our pear trees, in many cases destroying the foliage so thoroughly that they looked as if they had been scorched by a fire, every leaf in some instances dropping from the trees, so that for a time they were bare as in mid-winter. Nearly a thousand trees in the young pear orchards of the writer suffered severely. During the latter part of June and the early days of July we had no opportunity of inspecting these trees, and when we visited them on the 7th of July they were so much injured that we thought they could not be much worse, and as the slugs were then full-grown and fast disappearing and the application of a remedy to so many trees a matter of much labour nothing was attempted to remedy the evil then.

It was observed that some trees were remarkably exempt from the attacks of these slugs Clapp's favourite deserves to be especially mentioned on this account, its thick glossy leaves

seemed to be uninviting, and when all around were seared, and browned, and withered trees of this variety wherever found were covered with a foliage rendered doubtly attractive and beautiful by the waste and dismal appearance of those about them. The following notes were taken at the time in reference to the relative damage inflicted on the different varieties of pear trees in those portions of the orchards most injured. *Beurre Giffard* most of the trees slightly, a few badly damaged. *Ananas d'Ete*, but slightly injured. *Beurre d'Amanlis*, same as *Beurre Giffard*. *Beurre Goubault*, entirely stripped. *Brandywine*, some stripped, others but little affected in the same row. *Doyenne d'Ete*, badly injured. *Bartlett* suffered very much, nearly all the trees being stripped. *Edmunds* injured badly, but not so much as *Bartlett*. *Souvenir de Congress*, nearly stripped. *Kirtland*, *Dwarfs*, not much affected. *Standards*, badly injured. *Leech's Kingessing*, scarcely touched. *Osbands Summer*, badly damaged, not a leaf left on many of the trees. *Rostiezer*, some very badly injured, others not so much. *Dearborns Seedling*, nearly stripped. *Tyson*, badly affected. *Ott's Seedling*, not much injured. *Marechale de la Cour*, nearly free. *Beurre de Montgeron*, *Frederica Bremer*, *Abbott* and *Fleur de Nieve*, scarcely touched. *Beurre Diel*, some few trees very much injured, others not so badly. *Gansel's Bergamot*, stripped. *Buffum* and *Beurre Superfin*, scarcely injured. *Sheldon*, injured, but not badly. *Beurre de Waterloo*, scarcely touched. *Beurre Amande*, singularly free. *Beurre St. Nicholas*, *Oswego Beurre* and *Golden Beurre*, not much injured. *Beurre de Paimpool*, nearly stripped. It was intended to go over all the other varieties in a similar manner, but opportunity did not offer. In the course of another fortnight new leaves began to push out vigorously on the defoliated trees and within a month or six weeks all was green again.

In the meantime these mischief makers were preparing for a second descent, and we in turn were preparing to receive them; on the 29th of July, when going through the orchards in the afternoon, the new brood of flies were found in the greatest abundance, resting on the young leaves, or on those portions of green which still remained on the leaves partially eaten by the last brood, they were congregated, however, more especially on those trees where green leaves were most abundant. On disturbing them they would fall to the ground with the antennæ bent under their bodies, and the head bent forward. On half a dozen trees we caught about 60 specimens, and might have taken hundreds, they were so thickly spread that in many instances there were two and three on a single leaf. By the last week in August, the second brood of slugs were hatched; some very tiny creatures, others by this time half grown. Now, those trees which had previously escaped were all more or less covered, and would no doubt soon have been stripped, had not some measures been at once taken to destroy them. A raised platform was rigged up in a one horse cart in which was placed a barrel of water in which a pound of powdered hellebore had been mixed, and from the elevated stand this mixture was showered lightly on the trees from the rose of a watering pot. It was astonishing how quickly the trees were cleaned scarcely one could be found on a tree the morning after the application had been made, and ten pounds of hellebore with five or six days work of man and horse served to go over the whole ground, the work being completed in much less time than we had supposed it could.

THE GRAPE VINE PHYLLOXERA.

(*Phylloxera vastatrix*, PLANCHON.)

COMPILED BY THE REV. C. J. S. BETHUNE, M.A.

With the exception of the Colorado Potato Beetle, and the Locust of the Western States, of which we have given an account in another article, there is probably no insect that attracts more general attention at the present time than the destructive Grape-Vine Phylloxera (*P. vastatrix*, Planchon). To us in Canada it is but little known, but as its ravages may spread over our own vineyards at any time, and as it must be an object of interest to all vinegrowers, we think it proper to present to the readers of this Report an account of the insect and such other particulars as we are enabled to gather together. The fact of the rare occurrence of the insect in this country, and the consequent difficulties in the way of its study, is a sufficient reason, we trust, why we should offer a compilation from the writings of others, rather than attempt any original remarks of our own. Our quotations, unless otherwise specified, will be taken from the admirable paper on the Phylloxera, by our valued friend, Professor C. V. Riley, State Entomologist of Missouri, contained in his last Report (*Sixth Annual Report on the Insects of Missouri*, 1874, pages 30-87.) The estimation in which Mr. Riley's work in this respect is held in the great vine-growing countries of Europe, may be judged from the fact that, in the month of February last, he was presented with a very handsome gold medal by the Minister of Agriculture and Commerce of France, "in appreciation of his discoveries in Economic Entomology, and especially of his services rendered to French grape culture."

Though one form of the insect, the gall-inhabiting type, was noticed by Dr. Fitch, State Entomologist of New York, as long ago as 1856, very little attention was paid to it for some years. At length the serious disease of the grape-vine began to attract attention in France, and to cause so much alarm, that the authorities offered a prize of 20,000 francs for an effectual and practicable remedy. The disease was at first termed *pourridie*, or rotting—the roots becoming swollen and bloated, and finally wasting away. There were no end of surmises and theories as to cause, until Professor J. É. Planchon, of Montpellier, in July, 1868, announced that it was due to the puncture of a minute insect belonging to the plant-louse family (*Aphididae*), and bearing a close resemblance to our gall-louse." The following January, Professor Westwood, of Oxford, England, announced that he considered both the gall and root-inhabiting types to be different forms of the same insect. Shortly after a French writer gave it as his opinion that the European insect was identical with the American species long before described by Dr. Fitch. "This opinion," says Mr. Riley, "gave an additional interest to this insect, and I succeeded, in 1870, in establishing the identity of the French gall-insect with ours. During the same year I also established the identity of the gall and root-inhabiting types, by showing that in the fall of the year the last brood of gall-lice betake themselves to the roots and hibernate thereon. In 1871, I visited France and studied their insect in the field; and in the fall of that year, after making more extended observations here, I was able to give absolute proof of the identity of the two insects, and to make other discoveries, which not only interested our friends abroad, but were of vital importance to our own grape-growers, especially in the Mississippi Valley. I have given every reason to believe that the failure in the European vine, (*Vitis vinifera*), when planted here, the partial failure of many hybrids with the European *vinifera*, and the deterioration and death of many of the more tender-rooted native varieties, are mainly owing to the injurious work of this insidious little root-louse. It

had been at its destructive work for years, producing injury the true cause of which was never suspected until the publication of the article in my fourth Report. I also showed that some of our native varieties enjoyed relative immunity from the insects' attacks, and urged their use for stocks, as a means of re-establishing the blighted vineyards of Southern France."

"The disease continued to spread in Europe, and became so calamitous in the last-named country that the French Academy of Sciences appointed a standing Phylloxera Committee. It is also attracting some attention in Portugal, Austria and Germany, and even in England, where it affects hot-house grapes."

NATURAL HISTORY OF THE INSECT.

The genus *Phylloxera* is characterized by having three-jointed antennæ, the third or terminal being much the longest, and by carrying its wings overlapping, flat on the back instead of roof-fashion. It belongs to the sub-order of whole-winged bugs (*Homoptera*), and forms a connecting link between two of its great families, the Plant-lice (*Aphididæ*) on the one hand, and the Bark-lice (*Coccidæ*) on the other. It is generally considered, however, to pertain to the former family, though some naturalists, with the not uncommon love of introducing new names and minute classifications, have desired to found a new family for this special insect.

Not the least interesting feature in the economy of the *Phylloxera* is the different phases or forms under which it presents itself. Among these forms are two constant types which have led many to suppose that we have to do with two species. The one type, which for convenience Mr. Riley terms *gallæcola*, lives in galls on the leaves; the other which he calls *radicicola*, lives on swellings of the roots. They may be tabulated thus:—

Type 1. *Gallæcola* (see Figure 43, *f*, *g*, *h*),

Type 2. *Radicicola*.

A, Degraded or wingless form (see Figure 44, *e*, *f*, *g*.)

B, Perfect or winged form (see Figure 45, *g*, *h*.)

"**TYPE GALLÆCOLA OR GALL-INHABITING.**—The gall or excrescence produced by this insect is simply a fleshy swelling of the under side of the leaf, more or less wrinkled and hairy, with a corresponding depression of the upper side, the margin of the cup being fuzzy, and drawn together so as to form a fimbriated mouth. It is usually cup-shaped, but sometimes greatly elongated or purse-shaped.

Soon after the first vine-leaves that put out in the spring have fully expanded, a few

Fig. 42.

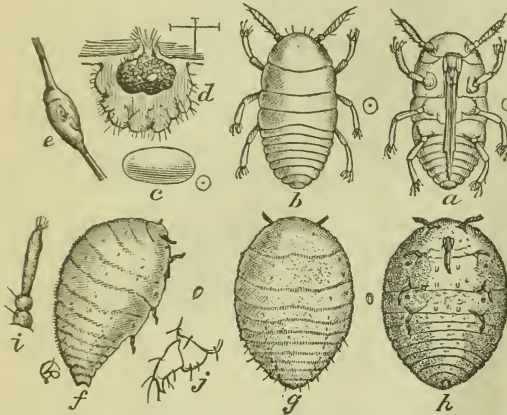


Under side of Leaf covered with Galls.

scattering galls may be found, mostly on the lower leaves, nearest the ground. These vernal galls are usually large, (of the size of an ordinary pea), and the normal green is often blushed with rose where exposed to the light of the sun. On carefully opening one of them (Fig. 43, *d*) we shall find the mother-louse diligently at work surrounding herself with pale-yellow eggs of an elongate oval form, scarcely .01 inch long, and not quite half as thick (Fig. 43, *c*). She is about .04 inch long, generally spherical in shape, of a dull orange colour, and looks not unlike an immature seed of the common purslane. At times, by the elongation of the abdomen, the shape assumes, more or less perfectly, the pyriform. Her members are all dusky, and so short compared to her swollen body, that she appears very clumsy, and undoubtedly would be outside of her gall, which she never has occasion to quit, and which serves her alike as dwelling-house and coffin. More carefully examined, her skin is seen to be shagrened or minutely granulated and furnished with rows of minute hairs. The eggs begin to hatch when six or eight days old into active

little oval, hexapod beings, which differ from their mother in their bright yellow colour and more perfect legs and antennæ, the tarsi being furnished with long, pliant hairs, terminating in a more or less distinct globule. In hatching, the eggs split longitudinally from the anterior end, and the young louse whose pale yellow is in strong contrast with the more dusky colour of the egg-shell, escapes in the course of two minutes. Issuing from the mouth of the gall, these young lice scatter over the vine, most of them finding their way to the tender terminal leaves, where they settle in the downy bed which the tomentose nature of these leaves affords, and commence pumping up and appropriating the sap. The tongue-sheath is blunt and heavy, but the tongue proper—consisting of three brown, elastic and wiry filaments, which, united, make so fine a thread as scarcely to be visible with the strongest microscope—is sharp, and easily run under the parenchyma of the

FIG. 43.

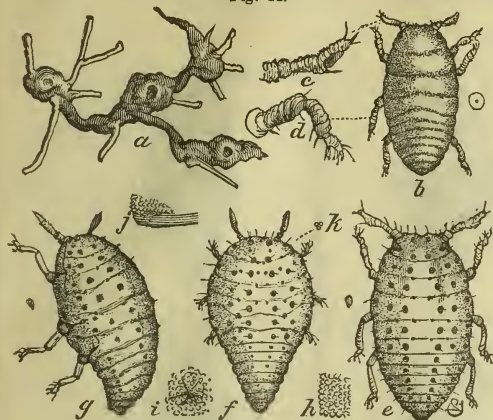


TYPE *GALLECOLA* :—*a*, *b*, newly-hatched larva, ventral and dorsal view; *c*, egg; *d*, section of gall; *e*, swelling of tendril; *f*, *g*, *h*, mother gall-louse—lateral, dorsal and ventral views; *i*, her antennæ; *j*, her two jointed tarsi. Natural sizes indicated at sides.

leaf. Its puncture causes a curious change in the tissues of the leaf, the growth being so stimulated that the under side bulges and thickens, while the down on the upper side increases in a circle around the louse, and finally hides and covers it as it recedes more and more within the deepening cavity. Sometimes the lice are so crowded that two occupy the same gall. If, from the premature death of the louse, or other cause, the gall becomes abortive before being completed, then the circle of thickened down or fuzz enlarges with the expansion of the leaf, and remains (Fig. 43, *c*) to tell the tale of the futile effort. Otherwise, in a few days the gall is formed, and the inhaled louse, which, while eating its way into house and home, was also growing apace, begins a parthenogenetic maternity by the deposition of the fertile eggs, as her immediate parent had done before. She increases in bulk with pregnancy, and one egg follows another in quick succession, until the gall is crowded. The mother dies and shrivels, and the young, as they hatch, issue and found new galls. This process continues during the summer until the fifth or sixth generation. Every egg brings forth a fertile female, which soon becomes wonderfully prolific. The number of eggs found in a single gall averages about 200; yet it will sometimes reach as many as 500, and, if Dr. Shimer's observations can be relied on, it may even reach 5,000. I have never found any such number myself; but, even supposing there are but five generations during the year, and taking the lowest of the above figures, the immense prolificacy of the species becomes manifest. As summer advances they frequently completely cover the leaves with their galls, and settle on the tendrils, leaf-stalks and tender branches, where they also form knots and rounded excrescences (Fig. 43, *e*) much resembling those on the roots. In such a case, the vine loses its leaves prematurely, usually, however, the natural enemies of the louse seriously reduce its numbers by the time the vine ceases its growth in the fall, and the few remaining lice, finding no more succulent and suitable leaves, seek the roots. Thus by the end of September, the galls are mostly deserted, and those which are left are almost always infested with mildew, and eventually turn brown and decay. On the roots the young lice attach themselves singly or in little groups and thus hibernates. The male louse has never been seen, nor does the female ever acquire wings. Indeed, too much stress cannot be laid on the fact that *Gallacola* occurs only as an agamic and apterous female form. It is but a transient summer state, not at all essential to the perpetuation of the species, and does, compared with the other type, but trifling damage. It has been found occasionally by Mr. Riley on all species of the grape-vine (*vinifera*, *riparia*, *estivalis* and *Labrusca*) cultivated in the Eastern and Middle States, and on the wild *cordifolia*; but it flourishes only on the river-bank grape (*riparia*), and more especially on the Clinton and Taylor, with their close allies. Thus while legions of the root-inhabiting type (*radicicola*) are overrunning and devastating the vineyards of France, this one is almost unknown there except on such American varieties as it infests with us."

"TYPE RADICICOLA OR ROOT-INHABITING.—We have seen that, in all probability, *gallæcola* exists only in the apterous, shagreened, non-tubercled, fecund female form. *Radici-*

Fig. 44.



TYPE RADICICOLA.—*a*, roots of Clinton vine, showing relation of swellings to leaf-galls, and power of resisting decomposition; *b*, larva as it appears when hibernating; *c*, *d*, antenna and leg of same; *e*, *f*, *g*, forms of more mature lice; *h*, granulations of skin; *i*, tubercle; *j*, transverse folds at borders of joints; *k*, simple eyes.

in the spring as many as two hundred and sixty-five eggs in a cluster, and all evidently from one mother, who was yet very plump and still occupied in laying. As a rule, however, they are less numerous. With pregnancy this form becomes quite tumid and more or less pyriform, and is content to remain with scarcely any motion in the more secluded parts of the roots, such as the creases, sutures and depressions, which the knots afford. The skin is distinctly shagreened (Fig. 44, *h*), as in *gallæcola*. The warts, though usually quite visible with a good lens, are at other times more or less obsolete, especially on the abdomen. The eyes, which were quite perfect in the larva, become more simple with each moult, until they consist, as in *gallæcola*, of but triple eyelets (Fig. 44, *k*), and, in the general structure, this form becomes more degraded with maturity, wherein it shows the affinity of the species to the *Coccidæ*, the females of which, as they mature, generally lose all trace of the members they possessed when born."

"The second or more oval form (Fig. 44, *e*), is destined to become winged. Its tubercles when once acquired, are always conspicuous; it is more active than the other, and its eyes increase rather than diminish in complexity with age. From the time it is one-third grown the little dusky wing-pads may be discovered, though less conspicuously than in the pupa state, which is soon after assumed. The pupæ (Fig. 45, *e*, *f*), are still more active, and after feeding a short time, they make their way to the light of day, crawl over the ground and over the vines, and finally shed their last skin and assume the winged state. In their last moult the tubercled skin splits on the back, and is soon worked off, the body in the winged insect having neither tubercles nor granulations."

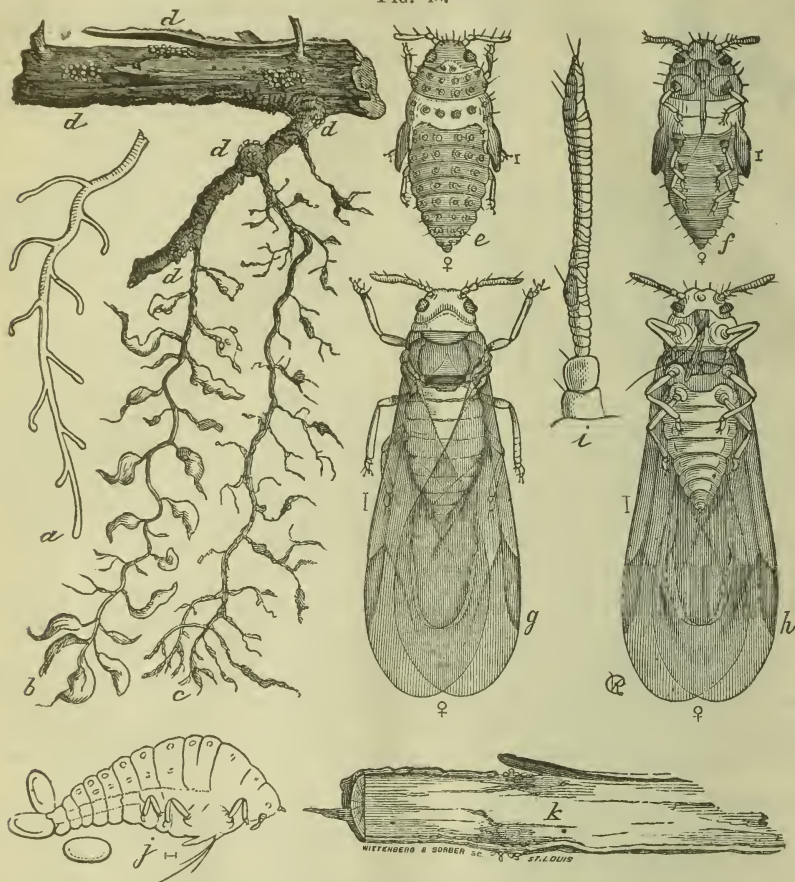
"The winged insects are most abundant in August and September, but may be found as early as the first of July, and until the vines cease growing in the fall. The majority of them are females, with the abdomen large and more or less elongate. From two to five eggs may invariably be found in the abdomen of these, and are easily seen when the insect is held up to the light, or mounted in balsam or glycerine."

"As fall advances the winged individuals become more and more scarce, and as winter sets in only eggs, newly-hatched larvæ, and a few apterous egg-bearing mothers, are seen. These last die and disappear during the winter, which is mostly passed in the larva state, with here and there a few eggs. The larvæ thus hibernating (Fig. 44, *b*) become dingy, with the body and limbs more shagreened and the claws less perfect than when first hatched; and, of thousands examined, all bear the same appearance, and all are furnished with strong

* "It is not to be understood, in making these distinctions, that these differences of form are so constant that they can always be relied on; for the form of the body varies, so that the wingless mother may present the more perfect oval of that destined to become winged."

suckers. As soon as the ground thaws and the sap starts in the spring, these young lice work off their winter coat, and, growing apace, commence to deposit eggs. All, without exception, become mothers, and assume the degraded form (A) already described.

FIG. 45.



TYPE RADICICOLA :—*a*, shows a healthy root; *b*, one on which the lice are working, representing the knots and swellings caused by their punctures; *c*, a root that has been deserted by them, and where the rootlets have commenced to decay; *d*, *d*, *d*, show how the lice are found on the larger roots; *e*, female pupa, dorsal view; *f*, same, ventral view; *g*, winged female, dorsal view; *h*, same, ventral view; *i*, magnified antenna of winged insect; *j*, side view of the wingless female, laying eggs on roots; *k*, shows how the punctures of the lice cause the larger roots to rot.

"At this season of the year, with the exuberant juices of the plant, the swellings on the roots are large and succulent, and the lice plump to repletion. One generation of the moth form (A) follows another—fertility increasing with the increasing heat and luxuriance of summer—until at last the third or fourth has been reached before the winged form (C) makes its appearance in the latter part of June or early in July. Such are the main features which the development of the insect presents, to one who has studied it in the field as well as in the closet.

"Since I proved, in 1870 (adds Mr. Riley), the absolute identity of these two types, showing that the gall-lice become root-lice, the fact has been repeatedly substantiated by different observers. Yet, strange to say, no one has heretofore succeeded in making gall-lice of the young hatched on the roots, though I formerly supposed that Signoret had done so. It is, therefore, with much satisfaction that I record the fact of having succeeded this winter in obtaining galls on a young Clinton vine from young *radicicola*, and of thus establishing beyond

peradventure, the specific interrelation and identity of the two types. I make this announcement with all the more pleasure, that for three years past, both on vines growing out doors and in pots in-doors, I had in vain attempted to obtain the same result."

PRACTICAL CONSIDERATIONS.

"THE MORE MANIFEST AND EXTERNAL EFFECTS OF THE PHYLLOXERA DISEASE.

—The result which follows the puncture of the root-louse is an abnormal swelling, different in form, according to the particular part and texture of the root. These swellings, which are generally commenced at the tips of the rootlets, where there is excess of plasmatic and albuminous matter, eventually rot, and the lice forsake them and betake themselves to fresh ones—the living tissue being necessary to the existence of this as of all plant-lice. The decay affects the parts adjacent to the swellings, and on the more fibrous roots cuts off the supply of sap to all parts beyond. As these last decompose, the lice congregate on the larger ones, until at last the root system literally wastes away."

"During the first year of attack there are scarcely any outward manifestations of disease, though the fibrous roots, if examined, will be found covered with nodosities, particularly in the latter part of the growing season. The disease is then in its incipient stage. The second year all these fibrous roots vanish, and the lice not only prevent the formation of new ones, but, as just stated, settle on the larger roots, which they injure by causing hypertrophy of the parts punctured, which also eventually become disorganized and rot. At this stage the outward symptoms of the disease first become manifest, in a sickly, yellowish appearance of the leaf and a reduced growth of cane. As the roots continue to decay, these symptoms become more acute, until by about the third year the vine dies. Such is the course of the malady on vines of the species *vinifera*, when circumstances are favourable to the increase of the pest. When the vine is about dying, it is generally impossible to discover the cause of the death, the lice which had been so numerous the first and second years of invasion, having left for fresh pasturage."

MODE OF SPREADING.—The gall-lice can only spread by travelling, when newly-hatched from one vine to another; and, if this slow mode of progression were the only one which the species is capable of, the disease would be comparatively harmless. The root-lice, however not only travel under-ground along the interlocking roots of adjacent vines, but crawl actively over the surface of the ground, or wing their way from vine to vine and from vineyard to vineyard. Doubts have been repeatedly expressed by European writers as to the power of such a delicate and frail-winged fly to traverse the air to any great distance. On the 27th of September, 1873, the weather being quite warm and summer-like, with much moisture in the atmosphere, Mr. Riley witnessed the insect's power of flight. Some two hundred winged individuals, that he had confined, became very restless and active, vigorously vibrating their wings and beating about their glass cages. Upon opening the cages, the lice began to dart away and were out of sight in a twinkling. They have been caught in spider-webs in Europe, and captured by Mr. Riley on sheets of paper prepared with bird-lime and suspended in an infested vineyard; it is clear, then, that they can sustain flight for a considerable time under favourable conditions, and with the assistance of the wind, they may be wafted to great distances. These winged females are much more numerous in the fall of the year than has been supposed by Entomologists. Wherever they settle, the few eggs which each carries are sufficient to perpetuate the species, which, in the fullest sense, may be called contagious.

"SUSCEPTIBILITY OF DIFFERENT VINES TO THE DISEASE.—As a means of coping with the Phylloxera disease, a knowledge of the relative susceptibility of different varieties to the attacks and injuries of the insect is of paramount importance. As is so frequently the case with injurious insects, and as we have a notable instance in the common Currant Aphis (*Aphis Ribesii*), which badly affects the leaves of some of the Currants, but never touches the Gooseberry which belongs to the same genus. The Phylloxera shows a preference for and thrives best on certain species, and even discriminates between varieties; or, what amounts to the same thing, practically, some varieties resist its attacks and enjoy a relative immunity from its injuries. It would be useless, and certainly unnecessary here, to attempt to ascertain the reason why certain vines thus enjoy exemption while others so readily succumb; but in a broad way it may be stated that there is a relation between the susceptibility of the vine and the character of its roots—the slow-growing, more tender-wooded and consequently more tender-rooted varieties succumbing most readily; the more vigorous powers resisting best."

From Mr. Riley's synopsis of experiments and observations we gather the following statement respecting the different varieties of grape:—

EUROPEAN VINE (*Vitis vinifera*)—Rarely subject to leaf-gall, but it generally succumbs to the attacks of root lice after a few years.

RIVER-BANK VINE (*V. riparia*)—The Cornucopia, Alvey and Othello suffer very little or not at all from Leaf-galls, but to a considerable extent from Root-lice. The Clinton and Taylor are very subject to the Leaf-galls, but from the great vitality of their roots they do not succumb to the attacks of the Root-lice. The Golden Clinton and Louisiana do not suffer much from either. The Marion a good deal affected by the former, but little by the latter. The Delaware suffers considerably from both.

SUMMER GRAPE (*V. aestivalis*)—The Cunningham, Norton's Virginia, and Rutlander suffer not at all from the Leaf-gall, and very little from the Root-lice. The Herbemont and Cynthiana suffer slightly from both.

NORTHERN FOX GRAPE (*Labrusca*)—The Challenge, Dracut Amber, Israella, Martha, Northern Muscadine and Wilder, are not subject to the Leaf-gall, and only slightly to the root-lice. The Diana, Goethe, Hartford, Isabella, Ives, Maxatawney, North Carolina, Rebecca and Salem are also free from the Leaf-gall, but have the Root-lice more abundant and suffer more from its attacks. The Catawba and Iona do not suffer from the Leaf-gall, but are most subject to the Root-lice. The Concord has the Leaf-galls but rarely, and does not suffer much from the Root-lice; the Creveling also is usually free from the former, but suffers much more from the latter.

SOUTHERN FOX GRAPE.—This species is entirely free from the Phylloxera in any form.

The above enumeration is founded principally upon Mr. Riley's observations in the central portion of Missouri; he has also examined many of the varieties in Kansas, Illinois, New Jersey, Pennsylvania and New York. The Arnold's hybrids, which he has examined, all suffer, he states, but some of them more than others.

MEANS OF COPING WITH THE DISEASE.—Grafting the more susceptible varieties on the roots of those that have a greater power of resistance, would probably counteract the disease to a great extent. This plan is now being tried on a large scale, but it will be necessary to wait a year or two before any positive conclusions can be obtained.

"In planting a new vineyard the greatest care should be taken not to introduce Phylloxera on the young plants, and a bath of weak lye or strong soap suds before planting will, perhaps, prove the best safeguard. Remembering that the lice are spreading over the ground from July till fall, and principally in the months of August and September, a thorough sprinkling of the surface with lime, ashes, sulphur, salt or other substance destructive to insect life, will, no doubt, have a beneficial effect in reducing their numbers and preventing their spread.

The insect has been found to thrive less and to be, therefore, less injurious in a sandy soil; while mixture of soot with the soil has had a beneficial effect in destroying the pest. It is, therefore, recommended for the more susceptible varieties, and that they be planted in trenches first prepared with a mixture of sand and soot. An addition of lime will also prove beneficial. There is every reason to believe that vines are rendered less susceptible to the disease by a system of pruning and training that will produce long canes and give them as nearly as possible their natural growth.

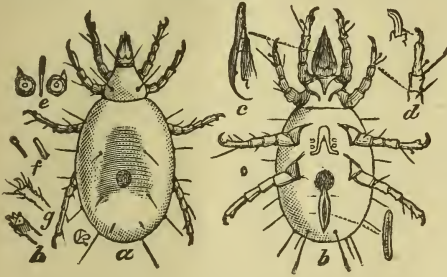
NATURAL ENEMIES.—There are a number of predaceous insects which serve to keep the leaf-lice in check; but as the injury is mostly done underground it will suffice to enumerate the principal of these in this connection. The most efficient is a black species of Fringe-wing or Thrips with white wings (*Thrips Phylloxerae*). They are found in several different kinds of Phylloxera galls, and do more than any other species to keep the leaf inhabiting species within bounds."

The next most efficient aids in the destruction of the leaf-lice are the lace-winged flies (*Chrysopa*); the lady birds (*Coccinella*); certain Syrphus fly larvæ; a few true bugs and other insects.

The enemies known to attack the Phylloxera underground are, naturally enough, fewer in number. In one instance, Mr. Riley relates, I have found a Scymnus larva at the work six inches below the surface, and there is a Syrphus fly, whose larva lives underground and feeds both on the apple-tree root-louse and on this grape root-louse. Wonderful indeed

is the instinct which teaches this blind larva to penetrate the soil in search of its prey; for the egg must necessarily be laid at the surface. But though the underground enemies of its own class are few, I have discovered a mite which preys extensively upon this root-inhabiting type, and which renders efficient aid in keeping it in check in this country. This mite (*Tyroglyphus phylloxerae*, Planchon & Riley, Fig. 46,) belongs to the same genus as the cheese and meal mites, and the species which infests preserved insects, and is such a pest in cabinets. At is the rule with mites, it is born with but six legs, but acquires eight after the first or second

FIG. 46.



PHYLLOXERA MITE, a, dorsal, b, ventral view of female, c, mouth-parts, d, f, g, h, forms of tarsal appendages, e, ventral tubercles of male.

preys by preference on the lice themselves."

"DIRECT REMEDIES.—The leaf-lice, which do not play such an important part in the disease as was at first supposed, may be controlled with sufficient ease by a little care in destroying the first galls which appear, and in pruning and destroying the terminal growth of infested vines later in the season. The root-lice are not so easily reached. As the effort will be according to the exigency, we may very naturally look to France for a direct remedy, if ever one be discovered. But of all the innumerable plans, patented or non-patented, that have been proposed, of all the many substances that have been experimented with under the stimulus of a large national reward, no remedy has yet been discovered which gives entire satisfaction, or is applicable to all conditions of soil. Nor is it likely that such a remedy ever will be discovered.

"While, therefore, not very satisfactory results have followed the use of pure insecticides, the application of fertilizers intended to invigorate the vine, and at the same time injure the lice, has been more productive of good. Especially has this been the case with fertilizers rich in potassic salts and nitrogenous compounds, such as urine. Sulphuret of potassium dissolved in liquid-manure; alkaline-sulphates, with copperas and rape seed; potassic salts, with guano; soot and cinders are, among other applications, most favourably mentioned.

Mr. Riley closes his very able Essay with the following remarks:—"We have in the history of the Grape Phylloxera, the singular spectacle of an indigenous American insect being studied, and its workings understood in a foreign land, before its presence in its most injurious form was even suspected in its native home. The Franco-Prussian war, with all its fearful consequences to France, has passed away; the five milliards of francs (one thousand million dollars) have been paid as indemnity to her victors, in so short a time that the civilized world looked on in wonder and astonishment. Yet this little Phylloxera, sent over doubtless in small numbers, by some American nurseryman, a few years since, continues its devastating work, and costs that unfortunate country millions of francs annually. The last German soldier has been removed—at terrible cost it is true—from French soil, but the Phylloxera army remains; and if another five milliard francs could extirpate the last individual of this liliputian insect host from her soil, "la belle France" would be cheaply rid of the enemy. Had the world, twenty years ago, possessed the knowledge we at present have of this insect and of its dangerous power, a few francs might have originally stayed its invasion of that great vine-growing and wine-making country. Needs there any more forcible illustration of the importance of economic entomology!"

In confirmation of this statement, we read in the monthly report of the Department of Agriculture (Washington, August and September, 1874), that "the Prefect of the Department of the Rhone, in France, has published a decree directing the mayor of each Commune within his jurisdiction, upon the indication of the presence of the Phylloxera, to proceed at

once to determine the limits of each local district infected by the insect. Every vine affected and all the roots within five meters are to be dug up and burned. This decisive measure has not escaped sharp criticism. To save the vine lands of the Rhone from destruction by this pest, it is now proposed to secure winter irrigation by a grand canal connected with that river. M. Dumont, *Ingénieur en chef des chaussées*, has developed, before a governmental commission, a scheme for the construction of such a canal, within four years, at a cost of 102,000,000 francs. This, it is supposed, will rescue from destruction over 60,000 acres of vine lands, yielding products worth 200,000,000 francs per annum and taxes amounting to 20,000,000 francs."

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